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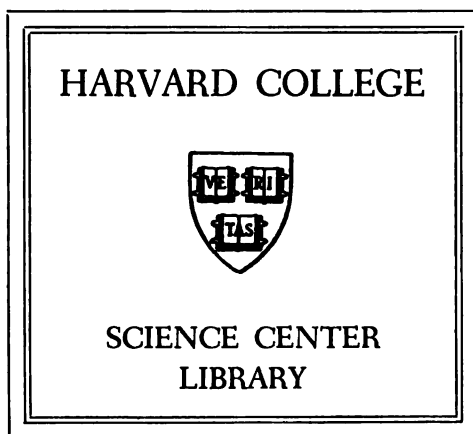
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THE  
**AMERICAN EPHEMERIS**

AND  
**NAUTICAL ALMANAC.**

FOR THE YEAR

**1 8 6 0.**

PUBLISHED BY AUTHORITY OF THE SECRETARY OF THE NAVY.

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BUREAU OF ORDNANCE AND HYDROGRAPHY,  
WASHINGTON.

1858.



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~~Sci 320.5~~ (1860)



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## PREFACE.

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THE preparation of the American Ephemeris and Nautical Almanac was begun in the latter part of the year 1849, in accordance with an act of Congress, approved on the 3d of March of that year. An account of this preparation, its details, the values of the constants adopted, and the means employed in various parts of the work to secure additional accuracy, or greater convenience, will be found in the Preface and Appendix of the first volume, for the year 1855. The form and arrangement of the Ephemeris, and the plan for prosecuting the work, then devised and adopted by Lieut. Charles Henry Davis, the Superintendent, with the co-operation of Prof. Benjamin Peirce, have been retained, with slight modification, in the succeeding volumes.

The contents of the volume for the year 1860 are the same, generally, as those of the preceding years. The articles "*On the Construction of the Ephemeris*," and "*On the Arrangement and Use of the Tables*," show the few changes that have been made. An Asteroid Supplement to this volume, containing Elements and Ephemerides of the Asteroids for the year 1859, will be published in time to meet the wants of astronomers for that year.

JOSEPH WINLOCK,  
*Prof. Math., U. S. Navy, Superintendent.*







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# ERRATA.

## ALMANAC FOR 1858.

Page 255, line first, R. A. for March, for 7<sup>h</sup>. 6<sup>m</sup>., read 1<sup>h</sup>. 6<sup>m</sup>.

" 316, line seventeenth, column *Piscium*, for 0<sup>h</sup>. 55<sup>m</sup>., read 0<sup>h</sup>. 45<sup>m</sup>.

" 437, 438, instead of the corresponding occultations, read

1858.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.				Duration of Occultation.
			Washington		Angle from		Washington		Angle from		
			Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
			h. m.	h. m.	°	°	h. m.	h. m.	°	°	h. m.
Mar. 19	<i>ε</i> Pleiadum	7½	6 35	6 46	253	310	7 21	7 32	140	199	0 46
22	47 Geminor.	6	13 11	13 9	345	39	Star 2'.6 north of <i>δ</i> 's limb.				
June 29	<i>δ</i> Capricor.	3	20 37	14 5	253	239	21 29	14 57	180	178	0 52
July 17	85 Virginis	6	17 58	10 16	296	341	18 44	11 1	20	69	0 45
Aug. 30	29 Pleiadum	8	19 49	9 13	256	211	20 28	9 52	142	93	0 40
Sept. 19	<i>γ</i> Capricor.	3½	18 19	6 25	317	280	19 41	7 47	119	94	1 22
20	<i>σ</i> Aquarii	4½	21 2	9 3	309	290	22 24	10 25	149	149	1 22
Oct. 30	49 Leonis	6	8 11	17 33	203	163	9 17	18 39	86	61	1 6

## ALMANAC FOR 1859.

Page 316, line seventeenth, column *Piscium*, for 0<sup>h</sup>. 55<sup>m</sup>., read 0<sup>h</sup>. 45<sup>m</sup>.

" 329, Hor. Par. for December 30<sup>d</sup>.5, for 54' 21".2, read 54' 26".2.

" 388, 389, Longitude of Mercury, the precession from the beginning of the year has been omitted.

" 389, Longitude of Mars, the nutation has been omitted.

## ALMANAC FOR 1860.

Page 121, Phases of the Moon, First Quarter, for 24<sup>d</sup>. 18<sup>h</sup>. 19<sup>m</sup>.7, read 24<sup>d</sup>. 17<sup>h</sup>. 40<sup>m</sup>.3.

" 302, date Aug. 6, column Apparent Decl. for Apparent Noon, for 58".6, read 54".6.



## CHRONOLOGICAL ERAS AND CYCLES.

### CHRONOLOGICAL ERAS.

THE YEAR 1860, WHICH COMPRISES THE LATTER PART OF THE 84TH AND THE BEGINNING OF THE 85TH YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO

The year 6573 of the Julian Period ;

“ 7368 – 69 of the Byzantine era ;

“ 5620 – 21 of the Jewish era ;

“ 2613 since the foundation of Romè, according to Varro ;

“ 2607 since the beginning of the era of Nabonassar, which has been assigned to Wednesday, the 26th of February, of the 3967th year of the Julian Period, corresponding according to the chronologists to the 747th, and according to the astronomers to the 746th year before the birth of Christ ;

“ 2636 of the Olympiads, or the fourth year of the 659th Olympiad, commencing in July, 1857, if we fix the era of the Olympiads at 775½ years before Christ, or near the beginning of July of the year 3938 of the Julian Period ;

“ 2172 of the Grecian era, or the era of the Seleucidæ ;

“ 1576 of the era of Diocletian.

The year 1277 of the Mohammedan era, or the era of the Hegira, begins on the 20th of July, 1860.

The first day of January of the year 1860 is the 2,400,411th day since the commencement of the Julian Period.

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## ASTRONOMICAL SYMBOLS AND ABBREVIATIONS.

### SYMBOLS OF THE PLANETS, &c.

☉	Sun.	♂	Mars.
☾	Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	♅	Uranus.
♂ or ⊕	Earth.	♆	Neptune.

### SYMBOLS OF THE ASTEROID-GROUP.

①	Ceres.	⑮	Melpomene.	③⑤	Leucothea.
②	Pallas.	⑯	Fortuna.	③⑥	Atalanta.
③	Juno.	⑰	Massilia.	③⑦	Fides.
④	Vesta.	⑱	Lutetia.	③⑧	Leda.
⑤	Astræa.	⑳	Calliope.	③⑨	Lætitia.
⑥	Hebe.	㉑	Thalia.	④①	Harmonia.
⑦	Iris.	㉒	Themis.	④②	Daphne.
⑧	Flora.	㉓	Phocæa.	④③	Isis.
⑨	Metis.	㉔	Proserpina.	④④	Ariadne.
⑩	Hygea.	㉕	Euterpe.	④⑤	Nysa.
⑪	Parthenope.	㉖	Bellona.	④⑥	
⑫	Clio.	㉗	Amphitrite.	④⑦	Aglæa.
⑬	Egeria.	㉘	Urania.	④⑧	
⑭	Irene.	㉙	Euphrosyne.	④⑨	Pales.
⑮	Eunomia.	㉚	Pomona.	⑤①	Verginia.
⑯	Psyche.	㉛	Polyhymnia.	⑤②	Nemausa.
⑰	Thetis.	㉜	Circe.	⑤③	Europa.

### SIGNS OF THE ZODIAC.

♈	Aries.	♌	Leo.	♐	Sagittarius.
♉	Taurus.	♍	Virgo.	♑	Capricornus.
♊	Gemini.	♎	Libra.	♒	Aquarius.
♋	Cancer.	♏	Scorpio.	♓	Pisces.

### ASPECTS AND NOTATIONS.

♌	Superior Conjunction.	°	Degrees.
♍	Inferior Conjunction.	'	Minutes of a Degree.
☐	Quadrature.	"	Seconds of a Degree.
♌	Opposition.	h.	Hours.
♌	Ascending Node.	m.	Minutes of Time.
♍	Descending Node.	s.	Seconds of Time.



# **ASTRONOMICAL EPHEMERIS**

**FOR THE USE OF**

## **NAVIGATORS.**



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sideral Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		h. m. s.	s.		° ' "	"					
Sun.	1	18 45	6.72	11.048	S. 23 3 12.5	11.91	16' 18.40	71.11	3 36.77	1.192	
Mon.	2	18 49	31.74	11.033	22 58 12.8	12.05	16 18.40	71.07	4 5.14	1.178	
Tues.	3	18 53	56.39	11.017	22 52 45.7	14.19	16 18.40	71.02	4 33.15	1.162	
Wed.	4	18 58	20.64	10.998	22 46 51.4	15.32	16 18.40	70.97	5 0.76	1.144	
Thur.	5	19 2	44.46	10.980	22 40 30.1	16.44	16 18.39	70.91	5 27.95	1.125	
Fri.	6	19 7	7.84	10.960	22 33 41.8	17.57	16 18.37	70.85	5 54.70	1.106	
Sat.	7	19 11	30.75	10.941	22 26 26.9	18.67	16 18.34	70.79	6 20.97	1.086	
Sun.	8	19 15	53.16	10.920	22 18 45.4	19.76	16 18.31	70.92	6 46.75	1.065	
Mon.	9	19 20	15.05	10.898	22 10 37.6	20.85	16 18.28	70.65	7 12.02	1.043	
Tues.	10	19 24	36.40	10.875	22 2 3.8	21.93	16 18.24	70.57	7 36.75	1.019	
Wed.	11	19 28	57.20	10.851	21 53 4.0	23.01	16 18.19	70.49	8 0.92	0.995	
Thur.	12	19 33	17.42	10.827	21 43 38.7	24.07	16 18.13	70.41	8 24.52	0.970	
Fri.	13	19 37	37.05	10.802	21 33 48.1	25.12	16 18.07	70.33	8 47.54	0.945	
Sat.	14	19 41	56.06	10.776	21 23 32.5	26.16	16 18.00	70.23	9 9.94	0.919	
Sun.	15	19 46	14.44	10.750	21 12 52.1	27.18	16 17.93	70.14	9 31.70	0.898	
Mon.	16	19 50	32.17	10.723	21 1 47.1	28.19	16 17.85	70.05	9 52.81	0.865	
Tues.	17	19 54	49.24	10.695	20 50 18.0	29.19	16 17.76	69.95	10 13.26	0.837	
Wed.	18	19 59	5.61	10.666	20 38 25.2	30.18	16 17.67	69.85	10 33.03	0.808	
Thur.	19	20 3	21.27	10.636	20 26 8.7	31.16	16 17.58	69.75	10 52.08	0.779	
Fri.	20	20 7	36.22	10.605	20 13 28.9	32.12	16 17.49	69.65	11 10.42	0.749	
Sat.	21	20 11	50.42	10.574	20 0 26.3	33.06	16 17.39	69.55	11 28.02	0.718	
Sun.	22	20 16	3.86	10.542	19 47 1.5	33.99	16 17.29	69.45	11 44.87	0.685	
Mon.	23	20 20	16.53	10.510	19 33 14.5	34.90	16 17.18	69.34	12 0.94	0.652	
Tues.	24	20 24	28.42	10.477	19 19 5.8	35.79	16 17.07	69.23	12 16.22	0.619	
Wed.	25	20 28	39.50	10.443	19 4 35.8	36.67	16 16.96	69.12	12 30.70	0.586	
Thur.	26	20 32	49.76	10.409	18 49 44.7	37.54	16 16.84	69.01	12 44.37	0.552	
Fri.	27	20 36	59.21	10.375	18 34 33.2	38.39	16 16.72	68.90	12 57.23	0.518	
Sat.	28	20 41	7.83	10.341	18 19 1.6	39.21	16 16.60	68.79	13 9.26	0.483	
Sun.	29	20 45	15.61	10.306	18 3 10.4	40.02	16 16.47	68.67	13 20.45	0.446	
Mon.	30	20 49	22.55	10.271	17 46 59.9	40.82	16 16.34	68.55	13 30.80	0.413	
Tues.	31	20 53	28.64	10.235	17 30 30.4	41.60	16 16.20	68.44	13 40.32	0.378	
Wed.	32	20 57	33.89	10.200	S. 17 13 42.4	42.36	16 16.06	68.33	13 48.99	0.343	

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sideral Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour.			
		h.	m.	s.		°	'	"				
Sun.	1	18	45	6.07	11.048	S. 23	3	13.2	11.91	3 36.71	1.192	18 41 29.36
Mon.	2	18	49	30.99	11.033	22	58	13.7	13.05	4 5.08	1.178	18 45 25.91
Tues.	3	18	53	55.54	11.017	22	52	46.8	14.19	4 33.07	1.162	18 49 22.47
Wed.	4	18	58	19.70	10.999	22	46	52.7	15.32	5 0.67	1.144	18 53 19.03
Thur.	5	19	2	43.44	10.980	22	40	31.6	16.44	5 27.85	1.125	18 57 15.59
Fri.	6	19	7	6.74	10.960	22	33	43.5	17.57	5 54.60	1.106	19 1 12.14
Sat.	7	19	11	29.57	10.941	22	26	28.8	18.67	6 20.87	1.086	19 5 8.70
Sun.	8	19	15	51.90	10.920	22	18	47.6	19.76	6 46.64	1.065	19 9 5.26
Mon.	9	19	20	13.72	10.898	22	10	40.1	20.85	7 11.90	1.043	19 13 1.62
Tues.	10	19	24	35.00	10.875	22	2	6.6	21.93	7 36.62	1.019	19 16 58.38
Wed.	11	19	28	55.73	10.851	21	53	7.1	23.01	8 0.79	0.995	19 20 54.94
Thur.	12	19	33	15.89	10.827	21	43	42.1	24.07	8 24.39	0.970	19 24 51.50
Fri.	13	19	37	35.46	10.802	21	33	51.8	25.12	8 47.41	0.945	19 28 48.05
Sat.	14	19	41	54.41	10.776	21	23	36.5	26.16	9 9.80	0.919	19 32 44.61
Sun.	15	19	46	12.73	10.750	21	12	56.4	27.18	9 31.56	0.893	19 36 41.17
Mon.	16	19	50	30.40	10.723	21	1	51.7	28.19	9 52.67	0.865	19 40 37.73
Tues.	17	19	54	47.41	10.695	20	50	22.9	29.19	10 13.12	0.837	19 44 34.29
Wed.	18	19	59	3.73	10.666	20	38	30.4	30.18	10 32.89	0.808	19 48 30.84
Thur.	19	20	3	19.34	10.636	20	26	14.3	31.16	10 51.94	0.779	19 52 27.40
Fri.	20	20	7	34.24	10.605	20	13	34.9	32.12	11 10.28	0.749	19 56 23.96
Sat.	21	20	11	48.40	10.574	20	0	32.7	33.06	11 27.88	0.718	20 0 20.52
Sun.	22	20	16	1.80	10.542	19	47	8.2	33.99	11 44.73	0.685	20 4 17.07
Mon.	23	20	20	14.43	10.510	19	33	21.5	34.90	12 0.80	0.652	20 8 13.63
Tues.	24	20	24	26.28	10.477	19	19	13.1	35.79	12 16.09	0.619	20 12 10.19
Wed.	25	20	28	37.32	10.443	19	4	43.4	36.67	12 30.57	0.586	20 16 6.75
Thur.	26	20	32	47.55	10.409	18	49	52.7	37.54	12 44.25	0.552	20 20 3.30
Fri.	27	20	36	56.97	10.375	18	34	41.5	38.39	12 57.11	0.518	20 23 59.86
Sat.	28	20	41	5.56	10.341	18	19	10.2	39.21	13 9.14	0.483	20 27 56.42
Sun.	29	20	45	13.32	10.306	18	3	19.3	40.02	13 20.35	0.448	20 31 52.97
Mon.	30	20	49	20.24	10.271	17	47	9.1	40.82	13 30.71	0.413	20 35 49.53
Tues.	31	20	53	26.31	10.235	17	30	39.9	41.60	13 40.23	0.378	20 39 46.08
Wed.	32	20	57	31.54	10.200	S. 17	13	52.2	42.36	13 48.90	0.343	20 43 42.64

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

THE SUN'S										
Day of the Month.	Day of the Year.	True LONGITUDE.				DIFF. for 1 hour.	LATITUDE.	Logarithm of the Radius Vector of the Earth.	DIFF. for 1 hour.	Mean Time of Sidereal Oh.
		λ		λ'	λ''					
		λ	λ'							
1	1	280° 22' 12.7	21° 59.7	152.91	+0.42	9.9926533	1.4	5 17 38.47		
2	2	281 23 22.4	23 9.2	152.90	0.46	.9926512	0.4	5 13 42.56		
3	3	282 24 31.8	24 18.4	152.88	0.48	.9926516	0.7	5 9 46.65		
4	4	283 25 40.8	25 27.2	152.87	0.48	.9926544	1.7	5 5 50.73		
5	5	284 26 49.4	26 35.6	152.85	0.44	.9926598	2.9	5 1 54.81		
6	6	285 27 57.8	27 43.9	152.84	0.37	.9926681	4.1	4 57 58.90		
7	7	286 29 5.9	28 51.8	152.83	0.29	.9926793	5.3	4 54 2.99		
8	8	287 30 13.8	29 59.5	152.82	0.17	.9926933	6.5	4 50 7.08		
9	9	288 31 21.4	31 6.9	152.81	+0.05	.9927101	7.7	4 46 11.16		
10	10	289 32 28.7	32 14.0	152.80	-0.08	.9927297	8.7	4 42 15.25		
11	11	290 33 35.8	33 21.0	152.79	0.21	.9927521	9.8	4 38 19.34		
12	12	291 34 42.7	34 27.7	152.78	0.32	.9927772	11.0	4 34 23.43		
13	13	292 35 49.4	35 34.2	152.78	0.42	.9928049	12.0	4 30 27.52		
14	14	293 36 56.0	36 40.6	152.77	0.51	.9928351	13.0	4 26 31.61		
15	15	294 38 2.3	37 46.7	152.76	0.57	.9928677	14.0	4 22 35.69		
16	16	295 39 8.4	38 52.7	152.75	0.59	.9929026	15.0	4 18 39.78		
17	17	296 40 14.3	39 58.4	152.74	0.59	.9929396	15.9	4 14 43.87		
18	18	297 41 19.9	41 3.8	152.72	0.57	.9929786	16.6	4 10 47.96		
19	19	298 42 25.1	42 8.8	152.71	0.52	.9930195	17.3	4 6 52.05		
20	20	299 43 29.8	43 13.3	152.69	0.43	.9930620	18.0	4 2 56.13		
21	21	300 44 34.0	44 17.4	152.66	0.33	.9931060	18.7	3 59 0.22		
22	22	301 45 37.5	45 20.7	152.63	0.20	.9931515	19.3	3 55 4.31		
23	23	302 46 40.3	46 23.3	152.60	-0.06	.9931986	19.9	3 51 8.40		
24	24	303 47 42.3	47 25.1	152.56	+0.08	.9932472	20.6	3 47 12.49		
25	25	304 48 43.3	48 26.0	152.52	0.21	.9932974	21.3	3 43 16.57		
26	26	305 49 43.3	49 25.9	152.48	0.34	.9933492	21.9	3 39 20.66		
27	27	306 50 42.3	50 24.7	152.43	0.44	.9934025	22.6	3 35 24.75		
28	28	307 51 40.0	51 22.2	152.38	0.53	.9934573	23.3	3 31 28.84		
29	29	308 52 36.4	52 18.4	152.32	0.59	.9935139	24.0	3 27 32.93		
30	30	309 53 31.5	53 13.4	152.27	0.61	.9935724	24.8	3 23 37.02		
31	31	310 54 25.2	54 7.0	152.21	0.61	.9936328	25.6	3 19 41.11		
32	32	311 55 17.6	54 59.2	152.15	+0.58	9.9936953	26.5	3 15 45.20		

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.



## GREENWICH MEAN TIME.

GREENWICH MEAN TIME.									
Day of the Month.	THE MOON'S								
	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
1	15 1.0	15 5.9	55 0.5	+1.38	55 18.3	+1.59	6 1.7	1.74	8.4
2	15 11.5	15 17.6	55 38.5	1.77	56 0.8	1.94	6 45.3	1.89	9.4
3	15 24.2	15 31.2	56 25.0	2.09	56 50.8	2.21	7 32.8	2.07	10.4
4	15 38.5	15 46.1	57 17.9	2.29	57 45.6	2.33	8 25.1	2.29	11.4
5	15 53.7	16 1.2	58 13.5	2.32	58 41.0	2.25	9 22.5	2.49	12.4
6	16 8.3	16 15.0	59 7.3	2.13	59 32.0	1.96	10 24.2	2.62	13.4
7	16 21.1	16 26.3	59 54.2	1.73	60 13.4	1.46	11 27.9	2.65	14.4
8	16 30.6	16 33.8	60 29.1	1.15	60 40.9	0.81	12 30.6	2.56	15.4
9	16 35.9	16 36.7	60 48.4	+0.45	60 51.6	+0.08	13 30.1	2.40	16.4
10	16 36.4	16 35.0	60 50.4	-0.28	60 45.1	-0.61	14 25.6	2.23	17.4
11	16 32.5	16 29.0	60 35.9	0.91	60 23.3	1.18	15 17.6	2.11	18.4
12	16 24.8	16 19.9	60 7.7	1.40	59 49.7	1.58	16 7.2	2.04	19.4
13	16 14.5	16 8.7	59 29.9	1.71	59 8.8	1.79	16 55.7	2.02	20.4
14	16 2.7	15 56.7	58 46.8	1.83	58 24.6	1.84	17 44.5	2.06	21.4
15	15 50.8	15 44.9	58 2.7	1.82	57 41.3	1.77	18 34.5	2.12	22.4
16	15 39.2	15 33.7	57 20.3	1.71	57 0.1	1.64	19 26.2	2.20	23.4
17	15 28.5	15 23.6	56 40.9	1.56	56 22.8	1.47	20 19.6	2.25	24.4
18	15 18.9	15 14.5	56 5.7	1.38	55 49.7	1.29	21 13.9	2.26	25.4
19	15 10.5	15 6.7	55 34.8	1.20	55 21.0	1.11	22 7.7	2.21	26.4
20	15 3.2	15 0.0	55 8.2	1.02	54 56.5	0.94	22 59.8	2.11	27.4
21	14 57.1	14 54.4	54 45.7	0.85	54 35.9	0.77	23 49.0	1.99	28.4
22	14 52.1	14 50.0	54 27.2	0.69	54 19.5	0.60	6		29.4
23	14 48.2	14 46.7	54 12.9	0.51	54 7.5	0.41	0 35.2	1.86	0.5
24	14 45.5	14 44.7	54 3.2	0.30	54 0.3	-0.19	1 18.5	1.75	1.5
25	14 44.8	14 44.4	53 58.8	-0.07	53 58.9	+0.07	1 59.5	1.68	2.5
26	14 44.9	14 45.8	54 0.6	+0.22	54 4.2	0.38	2 39.2	1.64	3.5
27	14 47.3	14 49.4	54 9.8	0.56	54 17.4	0.74	3 18.4	1.64	4.5
28	14 52.0	14 55.3	54 27.1	0.91	54 39.1	1.09	3 58.3	1.69	5.5
29	14 59.2	15 3.7	54 53.3	1.28	55 9.8	1.47	4 39.9	1.79	6.5
30	15 8.8	15 14.6	55 28.6	1.66	55 49.7	1.85	5 24.5	1.94	7.5
31	15 20.9	15 27.8	56 13.0	2.02	56 38.3	2.18	6 13.1	2.12	8.5
32	15 35.1	15 42.8	57 5.2	+2.31	57 33.4	+2.40	7 6.4	2.32	9.5



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 1.					TUESDAY 3.				
0	h m. s.	h.	N. o / "	"	0	h. m. s.	h.	N. o / "	"
0	0 33 1.59	1.8433	N. 8 28 7.3	18.306	0	2 7 13.69	2.1110	N. 18 25 2.3	11.188
1	0 34 52.32	1.8472	8 41 24.9	18.384	1	2 9 20.56	2.1183	18 36 9.3	11.079
2	0 36 43.26	1.8510	8 54 41.3	18.392	2	2 11 27.88	2.1267	18 47 11.8	11.004
3	0 38 34.43	1.8549	9 7 56.3	18.398	3	2 13 35.64	2.1331	18 58 9.8	10.928
4	0 40 25.84	1.8589	9 21 9.9	18.213	4	2 15 43.85	2.1406	19 9 3.2	10.860
5	0 42 17.49	1.8629	9 34 22.0	18.188	5	2 17 52.52	2.1482	19 19 51.8	10.770
6	0 44 9.39	1.8670	9 47 32.5	18.162	6	2 20 1.64	2.1568	19 30 35.6	10.680
7	0 46 1.53	1.8712	10 0 41.5	18.136	7	2 22 11.22	2.1638	19 41 14.5	10.607
8	0 47 53.93	1.8755	10 13 48.8	18.108	8	2 24 21.26	2.1713	19 51 48.4	10.523
9	0 49 46.59	1.8799	10 26 54.5	18.080	9	2 26 31.77	2.1791	20 2 17.3	10.438
10	0 51 39.52	1.8844	10 39 58.4	18.050	10	2 28 42.75	2.1869	20 12 41.0	10.351
11	0 53 32.71	1.8889	10 53 0.5	18.020	11	2 30 54.20	2.1947	20 22 59.5	10.263
12	0 55 26.18	1.8935	11 6 0.8	18.989	12	2 33 6.12	2.2026	20 33 12.5	10.173
13	0 57 19.93	1.8982	11 18 59.2	18.956	13	2 35 18.50	2.2104	20 43 20.1	10.081
14	0 59 13.96	1.9030	11 31 55.7	18.924	14	2 37 31.35	2.2183	20 53 22.2	9.988
15	1 1 8.28	1.9078	11 44 50.1	18.890	15	2 39 44.68	2.2263	21 3 18.7	9.898
16	1 3 2.89	1.9127	11 57 42.5	18.855	16	2 41 58.50	2.2343	21 13 9.5	9.797
17	1 4 57.80	1.9178	12 10 32.7	18.819	17	2 44 12.80	2.2424	21 22 54.5	9.700
18	1 6 53.02	1.9229	12 23 20.8	18.782	18	2 46 27.59	2.2505	21 32 33.5	9.601
19	1 8 48.55	1.9280	12 36 6.6	18.744	19	2 48 42.86	2.2586	21 42 6.5	9.500
20	1 10 44.39	1.9332	12 48 50.1	18.703	20	2 50 58.62	2.2667	21 51 33.5	9.397
21	1 12 40.54	1.9386	13 1 31.2	18.664	21	2 53 14.87	2.2749	22 0 54.2	9.293
22	1 14 37.02	1.9440	13 14 9.8	18.623	22	2 55 31.62	2.2831	22 10 8.7	9.188
23	1 16 33.83	1.9495	N. 13 26 46.0	18.581	23	2 57 48.85	2.2913	N. 22 19 16.9	9.081
MONDAY 2.					WEDNESDAY 4.				
0	1 18 30.97	1.9551	N. 13 39 19.5	18.537	0	3 0 6.58	2.2995	N. 22 28 18.7	8.972
1	1 20 28.44	1.9606	13 51 50.5	18.494	1	3 2 24.79	2.3077	22 37 13.7	8.862
2	1 22 26.26	1.9663	14 4 18.8	18.449	2	3 4 43.50	2.3160	22 46 2.1	8.749
3	1 24 24.42	1.9723	14 16 44.4	18.402	3	3 7 9.70	2.3241	22 54 43.6	8.635
4	1 26 22.94	1.9783	14 29 7.1	18.355	4	3 9 22.39	2.3324	23 3 18.3	8.520
5	1 28 21.81	1.9841	14 41 27.0	18.307	5	3 11 42.58	2.3406	23 11 46.0	8.403
6	1 30 21.04	1.9901	14 53 43.9	18.257	6	3 14 3.26	2.3488	23 20 6.7	8.284
7	1 32 20.63	1.9963	15 5 57.8	18.206	7	3 16 24.43	2.3570	23 28 20.2	8.164
8	1 34 20.59	2.0025	15 18 8.6	18.154	8	3 18 46.10	2.3653	23 36 26.4	8.042
9	1 36 20.92	2.0088	15 30 16.3	18.102	9	3 21 8.26	2.3735	23 44 25.2	7.918
10	1 38 21.64	2.0151	15 42 20.8	18.047	10	3 23 30.91	2.3817	23 52 16.5	7.792
11	1 40 22.74	2.0215	15 54 21.9	17.991	11	3 25 54.05	2.3898	24 0 0.2	7.665
12	1 42 24.23	2.0280	16 6 19.7	17.934	12	3 28 17.68	2.3979	24 7 36.3	7.536
13	1 44 26.09	2.0345	16 18 14.0	17.876	13	3 30 41.80	2.4060	24 15 4.5	7.405
14	1 46 28.36	2.0411	16 30 4.8	17.817	14	3 33 6.40	2.4141	24 22 24.9	7.273
15	1 48 31.03	2.0478	16 41 52.0	17.757	15	3 35 31.49	2.4221	24 29 37.3	7.139
16	1 50 34.10	2.0546	16 53 35.6	17.695	16	3 37 57.05	2.4301	24 36 41.6	7.003
17	1 52 37.58	2.0614	17 5 15.4	17.631	17	3 40 23.10	2.4381	24 43 37.7	6.866
18	1 54 41.47	2.0683	17 16 51.3	17.566	18	3 42 49.62	2.4460	24 50 25.5	6.727
19	1 56 45.78	2.0753	17 28 23.3	17.501	19	3 45 16.62	2.4539	24 57 4.9	6.586
20	1 58 50.51	2.0823	17 39 51.4	17.434	20	3 47 44.09	2.4617	25 3 35.8	6.443
21	2 0 55.66	2.0894	17 51 15.4	17.366	21	3 50 12.03	2.4696	25 9 58.1	6.299
22	2 3 1.24	2.0966	18 2 35.3	17.296	22	3 52 40.43	2.4773	25 16 11.7	6.154
23	2 5 7.25	2.1038	18 13 50.9	17.223	23	3 55 9.29	2.4849	25 22 16.5	6.007
24	2 7 13.69	2.1110	N. 18 25 2.3	17.148	24	3 57 38.61	2.4926	N. 25 28 12.5	5.858



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 5.					SATURDAY 7.				
0	h. m. s.	s.	N. 25 28 12.5	5.886	0	h. m. s.	s.	N. 26 51 30.2	2.776
1	3 57 38.61	2.4925	25 33 59.4	5.707	1	6 6 35.82	2.7104	26 48 37.7	2.973
2	4 0 8.38	2.4999	25 39 37.3	5.584	2	6 9 18.45	2.7108	26 45 33.5	3.169
3	4 2 38.60	2.5073	25 45 5.9	5.400	3	6 12 1.10	2.7107	26 42 17.5	3.365
4	4 5 9.27	2.5147	25 50 25.3	5.245	4	6 14 43.74	2.7106	26 38 49.7	3.562
5	4 7 40.37	2.5220	25 55 35.3	5.088	5	6 17 26.37	2.7103	26 35 10.1	3.768
6	4 10 11.91	2.5293	26 0 35.9	4.929	6	6 20 8.97	2.7097	26 31 18.7	3.985
7	4 12 43.87	2.5368	26 5 26.9	4.769	7	6 22 51.54	2.7090	26 27 15.5	4.161
8	4 15 16.26	2.5438	26 10 8.2	4.608	8	6 25 34.05	2.7081	26 23 0.6	4.346
9	4 17 49.07	2.5502	26 14 39.8	4.445	9	6 28 16.51	2.7070	26 18 34.0	4.541
10	4 20 22.29	2.5570	26 19 1.6	4.280	10	6 30 58.89	2.7057	26 13 55.7	4.735
11	4 22 55.91	2.5637	26 23 13.5	4.114	11	6 33 41.20	2.7043	26 9 5.8	4.929
12	4 25 29.93	2.5708	26 27 15.3	3.943	12	6 36 23.41	2.7037	26 4 4.2	5.122
13	4 28 4.35	2.5768	26 31 7.1	3.778	13	6 39 5.62	2.7030	25 58 51.1	5.316
14	4 30 39.16	2.5832	26 34 48.7	3.608	14	6 41 47.52	2.6990	25 53 26.4	5.507
15	4 33 14.34	2.5896	26 38 20.0	3.436	15	6 44 29.40	2.6989	25 47 50.2	5.699
16	4 35 49.89	2.5956	26 41 41.0	3.263	16	6 47 11.15	2.6946	25 42 2.5	5.890
17	4 38 25.81	2.6016	26 44 51.6	3.089	17	6 49 52.76	2.6922	25 36 3.4	6.080
18	4 41 2.09	2.6073	26 47 51.7	2.914	18	6 52 34.21	2.6896	25 29 52.9	6.269
19	4 43 38.71	2.6132	26 50 41.2	2.737	19	6 55 15.51	2.6836	25 23 31.1	6.457
20	4 46 15.68	2.6188	26 53 20.1	2.560	20	6 57 56.62	2.6836	25 16 58.1	6.644
21	4 48 52.97	2.6243	26 55 48.2	2.379	21	7 0 37.56	2.6807	25 10 13.8	6.831
22	4 51 30.59	2.6296	26 58 5.6	2.199	22	7 3 18.31	2.6775	25 3 18.4	7.017
23	4 54 8.52	2.6348	N. 27 0 12.1	2.017	23	7 5 58.87	2.6741	N. 24 56 11.9	7.201
24	4 56 46.77	2.6398							
FRIDAY 6.					SUNDAY 8.				
0	h. m. s.	s.	N. 27 2 7.7	1.835	0	h. m. s.	s.	N. 24 48 54.3	7.381
1	4 59 25.30	2.6447	27 3 52.3	1.651	1	7 8 39.21	2.6706	24 41 25.8	7.566
2	5 2 4.13	2.6494	27 6 25.8	1.466	2	7 11 19.34	2.6699	24 33 46.4	7.747
3	5 4 43.23	2.6540	27 6 48.2	1.281	3	7 13 59.24	2.6631	24 25 56.2	7.927
4	5 7 22.61	2.6584	27 7 59.5	1.094	4	7 16 38.91	2.6592	24 17 55.2	8.106
5	5 10 2.24	2.6626	27 8 59.5	0.906	5	7 19 18.34	2.6551	24 9 43.5	8.283
6	5 12 42.13	2.6667	27 9 48.2	0.717	6	7 21 57.53	2.6509	24 1 21.3	8.460
7	5 15 22.25	2.6706	27 10 25.6	0.528	7	7 24 36.45	2.6466	23 52 48.5	8.633
8	5 18 2.61	2.6743	27 10 51.6	0.338	8	7 27 15.12	2.6421	23 44 5.3	8.806
9	5 20 43.17	2.6779	27 11 6.2	0.148	9	7 29 53.51	2.6375	23 35 11.8	8.977
10	5 23 23.94	2.6813	27 11 9.3	0.044	10	7 32 31.63	2.6329	23 26 8.0	9.147
11	5 26 4.92	2.6845	27 11 0.9	0.236	11	7 35 0.46	2.6281	23 16 54.0	9.317
12	5 28 46.09	2.6875	27 10 41.0	0.429	12	7 37 47.00	2.6232	23 7 30.0	9.481
13	5 31 27.42	2.6903	27 10 9.5	0.623	13	7 40 24.24	2.6182	22 57 56.0	9.649
14	5 34 8.93	2.6930	27 9 26.3	0.817	14	7 43 1.18	2.6131	22 48 12.1	9.813
15	5 36 50.59	2.6956	27 8 31.5	1.011	15	7 45 37.81	2.6079	22 38 18.5	9.975
16	5 39 32.39	2.6978	27 7 25.0	1.206	16	7 48 14.13	2.6026	22 28 15.1	10.136
17	5 42 14.32	2.6999	27 6 6.8	1.401	17	7 50 50.13	2.5972	22 18 2.1	10.293
18	5 44 56.38	2.7018	27 4 36.9	1.596	18	7 53 25.81	2.5919	22 7 39.7	10.452
19	5 47 38.54	2.7036	27 2 55.3	1.792	19	7 56 1.15	2.5863	21 57 7.9	10.608
20	5 50 20.81	2.7051	27 1 1.9	1.988	20	7 58 36.16	2.5807	21 46 26.8	10.762
21	5 53 3.16	2.7064	26 58 56.7	2.185	21	8 1 10.33	2.5750	21 35 36.6	10.914
22	5 55 45.59	2.7076	26 56 39.7	2.382	22	8 3 45.16	2.5698	21 24 37.3	11.061
23	5 58 28.07	2.7086	26 54 10.8	2.579	23	8 6 19.15	2.5635	21 13 29.0	11.212
24	6 1 10.62	2.7094	N. 26 51 30.2	2.776	24	8 8 53.79	2.5577		
	6 3 53.20	2.7100				8 11 26.07	2.5518	N. 21 2 11.9	11.366



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination	Diff. for 1 m.	Hour.	Right Ascension	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 9.					WEDNESDAY 11.				
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>N</sup> <sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>N</sup> <sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	8 11 26.07	2.5518	N. 21 2 11.9	11.359	0	10 6 52.36	2.2880	N. 9 46 45.0	15.992
1	8 13 59.00	2.5457	20 50 46.0	11.802	1	10 9 8.92	2.2920	9 30 44.2	16.037
2	8 16 31.56	2.5397	20 39 11.5	11.614	2	10 11 23.81	2.2972	9 14 40.6	16.081
3	8 19 3.77	2.5337	20 27 28.5	11.786	3	10 13 39.10	2.2924	8 58 34.4	16.123
4	8 21 35.61	2.5276	20 15 37.2	11.924	4	10 15 54.10	2.2977	8 42 25.8	16.163
5	8 24 7.09	2.5215	20 3 37.6	12.061	5	10 18 8.82	2.2931	8 26 14.8	16.202
6	8 26 38.19	2.5153	19 51 29.9	12.196	6	10 20 23.27	2.2985	8 10 1.5	16.239
7	8 29 8.93	2.5091	19 39 14.1	12.329	7	10 22 37.45	2.2941	7 53 46.1	16.273
8	8 31 39.29	2.5029	19 26 50.4	12.460	8	10 24 51.36	2.2997	7 37 28.7	16.306
9	8 34 9.28	2.4967	19 14 18.9	12.589	9	10 27 5.01	2.2954	7 21 9.4	16.337
10	8 36 38.89	2.4904	19 1 39.7	12.716	10	10 29 18.41	2.2912	7 4 48.3	16.366
11	8 39 8.12	2.4841	18 48 53.1	12.840	11	10 31 31.55	2.2970	6 48 25.5	16.393
12	8 41 36.98	2.4778	18 35 59.1	12.962	12	10 33 44.45	2.2929	6 32 1.1	16.418
13	8 44 5.46	2.4716	18 22 57.7	13.083	13	10 35 57.10	2.2989	6 15 35.3	16.442
14	8 46 33.57	2.4653	18 9 49.2	13.202	14	10 38 9.52	2.2950	5 59 8.1	16.463
15	8 49 1.29	2.4590	17 56 33.6	13.318	15	10 40 21.70	2.2912	5 42 39.7	16.483
16	8 51 28.04	2.4527	17 43 11.1	13.432	16	10 42 33.66	2.1976	5 26 10.1	16.501
17	8 53 55.01	2.4463	17 29 41.9	13.545	17	10 44 45.39	2.1938	5 9 39.5	16.517
18	8 56 22.20	2.4400	17 16 5.9	13.656	18	10 46 56.91	2.1902	4 53 8.0	16.532
19	8 58 48.41	2.4338	17 2 23.3	13.768	19	10 49 8.21	2.1867	4 36 35.6	16.546
20	9 1 14.25	2.4275	16 48 34.3	13.880	20	10 51 19.31	2.1833	4 20 2.5	16.557
21	9 3 30.71	2.4212	16 34 38.9	13.973	21	10 53 30.20	2.1800	4 3 28.8	16.566
22	9 6 4.80	2.4150	16 20 37.1	14.074	22	10 55 40.90	2.1767	3 46 54.6	16.574
23	9 8 29.52	2.4083	N. 16 6 29.5	14.174	23	10 57 51.41	2.1735	N. 3 30 20.0	16.579
TUESDAY 10.					THURSDAY 12.				
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>N</sup> <sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>N</sup> <sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	9 10 53.86	2.4026	N. 15 52 16.2	14.271	0	11 0 1.73	2.1704	N. 3 13 45.1	16.594
1	9 13 17.83	2.3964	15 37 57.0	14.367	1	11 2 11.86	2.1675	2 57 10.0	16.596
2	9 15 41.43	2.3903	15 23 32.1	14.461	2	11 4 21.82	2.1646	2 40 34.8	16.596
3	9 18 4.66	2.3842	15 9 1.7	14.552	3	11 6 31.61	2.1617	2 23 59.6	16.593
4	9 20 27.54	2.3781	14 54 25.9	14.641	4	11 8 41.23	2.1589	2 7 24.6	16.588
5	9 22 50.05	2.3721	14 39 44.8	14.728	5	11 10 50.69	2.1564	1 50 49.8	16.578
6	9 25 12.19	2.3661	14 24 58.5	14.813	6	11 12 59.99	2.1539	1 34 15.2	16.572
7	9 27 33.98	2.3601	14 10 7.2	14.896	7	11 15 9.14	2.1514	1 17 41.0	16.565
8	9 29 55.41	2.3542	13 55 11.0	14.977	8	11 17 18.15	2.1490	1 1 7.3	16.556
9	9 32 16.48	2.3484	13 40 10.0	15.056	9	11 19 27.02	2.1467	0 44 34.2	16.546
10	9 34 37.21	2.3426	13 25 4.3	15.132	10	11 21 35.75	2.1445	0 28 1.8	16.534
11	9 36 57.59	2.3368	13 9 54.1	15.207	11	11 23 44.36	2.1423	N. 0 11 30.1	16.520
12	9 39 17.62	2.3311	12 54 39.5	15.279	12	11 25 52.84	2.1402	S. 0 5 0.7	16.504
13	9 41 37.31	2.3254	12 39 20.6	15.349	13	11 28 1.20	2.1383	0 21 30.5	16.488
14	9 43 56.67	2.3196	12 23 57.6	15.417	14	11 30 9.44	2.1364	0 37 59.3	16.470
15	9 46 15.68	2.3142	12 8 30.5	15.484	15	11 32 17.56	2.1346	0 54 26.9	16.450
16	9 48 34.37	2.3087	11 52 59.5	15.548	16	11 34 25.59	2.1329	1 10 53.3	16.429
17	9 50 52.73	2.3033	11 37 24.7	15.610	17	11 36 33.51	2.1313	1 27 18.4	16.406
18	9 53 10.76	2.2979	11 21 46.3	15.670	18	11 38 41.35	2.1296	1 43 42.1	16.382
19	9 55 28.47	2.2926	11 6 4.3	15.729	19	11 40 49.09	2.1281	2 0 4.2	16.356
20	9 57 45.87	2.2873	10 50 18.8	15.784	20	11 42 56.76	2.1270	2 16 24.7	16.329
21	10 0 2.95	2.2821	10 34 30.1	15.839	21	11 45 4.34	2.1267	2 32 43.6	16.300
22	10 2 19.73	2.2770	10 18 38.1	15.891	22	11 47 11.84	2.1265	2 49 0.7	16.270
23	10 4 36.19	2.2719	10 2 43.0	15.942	23	11 49 19.27	2.1264	3 5 16.0	16.239
24	10 6 52.36	2.2669	N. 9 46 45.0	15.992	24	11 51 26.65	2.1264	S. 3 21 29.4	16.206



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 13.					SUNDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	11 51 26.65	2.1934	S. 3 21 29.4	16.206	0	13 33 36.42	2.1607	S. 15 16 47.0	13.137
1	11 53 33.96	2.1916	3 37 40.8	16.172	1	13 35 46.12	2.1629	15 29 52.5	13.046
2	11 55 41.22	2.1908	3 53 50.0	16.136	2	13 37 55.97	2.1662	15 42 52.5	12.933
3	11 57 48.43	2.1198	4 9 57.0	16.093	3	13 40 5.96	2.1676	15 55 46.9	12.859
4	11 59 55.60	2.1191	4 26 1.8	16.050	4	13 42 16.09	2.1700	16 8 35.0	12.764
5	12 2 2.72	2.1186	4 42 4.9	16.020	5	13 44 26.37	2.1735	16 21 18.5	12.668
6	12 4 9.82	2.1180	4 58 4.2	16.979	6	13 46 36.80	2.1780	16 33 55.7	12.571
7	12 6 16.88	2.1175	5 14 1.7	16.967	7	13 48 47.38	2.1776	16 46 27.0	12.473
8	12 8 23.93	2.1171	5 29 56.6	16.958	8	13 50 58.11	2.1802	16 58 52.4	12.374
9	12 10 30.95	2.1169	5 45 48.8	16.947	9	13 53 9.00	2.1828	17 11 11.9	12.274
10	12 12 37.95	2.1167	6 1 38.3	16.930	10	13 55 20.04	2.1854	17 23 25.3	12.173
11	12 14 44.95	2.1165	6 17 24.9	16.758	11	13 57 31.24	2.1881	17 35 32.6	12.071
12	12 16 51.94	2.1166	6 33 8.7	16.708	12	13 59 42.61	2.1908	17 47 33.8	11.968
13	12 18 58.93	2.1168	6 48 49.5	16.664	13	14 1 54.14	2.1955	17 59 28.8	11.864
14	12 21 5.93	2.1166	7 4 27.2	16.608	14	14 4 5.83	2.1982	18 11 17.5	11.760
15	12 23 12.93	2.1168	7 20 1.6	16.560	15	14 6 17.69	2.1980	18 22 59.9	11.654
16	12 25 19.95	2.1171	7 35 32.8	16.496	16	14 8 29.71	2.2018	18 34 36.0	11.547
17	12 27 26.96	2.1174	7 51 0.8	16.430	17	14 10 41.90	2.2046	18 46 5.6	11.439
18	12 29 34.03	2.1178	8 6 25.5	16.362	18	14 12 54.97	2.2074	18 57 28.7	11.331
19	12 31 41.11	2.1183	8 21 46.7	16.294	19	14 15 6.80	2.2108	19 8 45.3	11.221
20	12 33 48.23	2.1189	8 37 4.4	16.265	20	14 17 19.60	2.2131	19 19 55.2	11.111
21	12 35 55.38	2.1196	8 52 18.5	16.206	21	14 19 32.37	2.2160	19 30 58.5	10.996
22	12 38 2.57	2.1202	9 7 29.0	16.144	22	14 21 45.42	2.2189	19 41 55.1	10.886
23	12 40 9.80	2.1210	S. 9 22 35.9	16.081	23	14 23 58.64	2.2218	S. 19 52 44.9	10.773
SATURDAY 14.					MONDAY 16.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	12 42 17.08	2.1218	S. 9 37 38.9	16.017	0	14 26 12.04	2.2247	S. 20 3 27.9	10.660
1	12 44 24.41	2.1227	9 52 37.9	16.961	1	14 28 25.61	2.2276	20 14 4.0	10.544
2	12 46 31.80	2.1237	10 7 33.0	16.904	2	14 30 39.36	2.2306	20 24 33.2	10.428
3	12 48 39.25	2.1247	10 22 24.1	16.817	3	14 32 53.98	2.2335	20 34 55.5	10.313
4	12 50 46.77	2.1256	10 37 11.1	16.748	4	14 35 7.38	2.2364	20 45 10.7	10.195
5	12 52 54.36	2.1270	10 51 53.9	16.678	5	14 37 21.65	2.2393	20 55 18.8	10.076
6	12 55 2.02	2.1288	11 6 32.5	16.607	6	14 39 36.09	2.2422	21 5 19.8	9.957
7	12 57 9.75	2.1295	11 21 6.8	16.535	7	14 41 50.71	2.2451	21 15 13.6	9.837
8	12 59 17.57	2.1310	11 35 36.7	16.462	8	14 44 5.61	2.2480	21 25 0.2	9.716
9	13 1 25.46	2.1324	11 50 2.2	16.387	9	14 46 20.48	2.2509	21 34 39.5	9.594
10	13 3 33.45	2.1339	12 4 23.2	16.312	10	14 48 35.62	2.2538	21 44 11.5	9.471
11	13 5 41.53	2.1354	12 18 39.6	16.235	11	14 50 50.93	2.2567	21 53 36.1	9.347
12	13 7 49.70	2.1370	12 32 51.4	16.157	12	14 53 6.42	2.2596	22 2 53.2	9.223
13	13 9 57.97	2.1387	12 46 58.5	16.078	13	14 55 22.08	2.2625	22 12 2.9	9.098
14	13 12 6.34	2.1404	13 1 0.8	15.998	14	14 57 37.90	2.2652	22 21 5.0	8.972
15	13 14 14.82	2.1422	13 14 58.3	15.917	15	14 59 53.99	2.2680	22 29 59.6	8.846
16	13 16 23.41	2.1441	13 28 50.8	15.836	16	15 2 10.05	2.2708	22 38 46.6	8.719
17	13 18 32.11	2.1460	13 42 38.4	15.751	17	15 4 26.38	2.2736	22 47 25.9	8.591
18	13 20 40.93	2.1479	13 56 30.9	15.667	18	15 6 42.88	2.2764	22 55 57.4	8.462
19	13 22 49.86	2.1499	14 9 58.4	15.582	19	15 8 59.54	2.2791	23 4 21.2	8.332
20	13 24 58.92	2.1520	14 23 30.7	15.496	20	15 11 16.37	2.2818	23 12 37.2	8.202
21	13 27 8.10	2.1541	14 36 57.8	15.407	21	15 13 33.36	2.2845	23 20 45.3	8.070
22	13 29 17.41	2.1563	14 50 19.6	15.318	22	15 15 50.50	2.2871	23 28 45.6	7.939
23	13 31 26.65	2.1586	15 3 36.0	15.228	23	15 18 7.81	2.2897	23 36 38.0	7.807
24	13 33 36.42	2.1607	S. 15 16 47.0	15.137	24	15 20 25.27	2.2922	S. 23 44 22.4	7.675



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 17.					THURSDAY 19.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	15 20 25.27	2.2922	S. 23 44 22.4	7.675	0	17 12 21.47	2.2421	S. 27 10 17.4	0.798
1	15 22 42.89	2.2950	23 51 58.8	7.840	1	17 14 42.03	2.2422	27 11 0.9	0.652
2	15 25 0.67	2.2975	23 59 27.2	7.406	2	17 17 2.53	2.2411	27 11 35.6	0.506
3	15 27 18.59	2.2999	24 6 47.5	7.271	3	17 19 22.96	2.2399	27 12 1.6	0.360
4	15 29 36.66	2.3024	24 13 59.7	7.135	4	17 21 43.32	2.2387	27 12 18.8	0.214
5	15 31 54.88	2.3048	24 21 3.7	6.999	5	17 24 3.61	2.2374	27 12 27.3	0.068
6	15 34 13.24	2.3072	24 27 59.6	6.862	6	17 26 23.81	2.2360	27 12 27.0	0.078
7	15 36 31.74	2.3095	24 34 47.2	6.725	7	17 28 43.92	2.2344	27 12 18.0	0.222
8	15 38 50.38	2.3118	24 41 26.6	6.587	8	17 31 3.94	2.2328	27 12 0.3	0.368
9	15 41 9.15	2.3138	24 47 57.6	6.447	9	17 33 23.86	2.2312	27 11 33.9	0.512
10	15 43 28.04	2.3160	24 54 20.3	6.308	10	17 35 43.68	2.2294	27 10 58.9	0.656
11	15 45 47.07	2.3181	25 0 34.6	6.168	11	17 38 3.39	2.2278	27 10 15.2	0.800
12	15 48 6.21	2.3200	25 6 40.6	6.029	12	17 40 22.98	2.2260	27 9 22.9	0.944
13	15 50 25.47	2.3220	25 12 38.2	5.889	13	17 42 42.46	2.2246	27 8 22.0	1.087
14	15 52 44.85	2.3239	25 18 27.3	5.748	14	17 45 1.80	2.2218	27 7 12.5	1.230
15	15 55 4.34	2.3268	25 24 7.9	5.607	15	17 47 21.02	2.2191	27 5 54.5	1.373
16	15 57 23.94	2.3276	25 29 40.1	5.465	16	17 49 40.09	2.2167	27 4 27.9	1.514
17	15 59 43.65	2.3293	25 35 3.8	5.323	17	17 51 59.03	2.2144	27 2 52.8	1.655
18	16 2 3.45	2.3309	25 40 18.9	5.180	18	17 54 17.82	2.2119	27 1 9.3	1.796
19	16 4 23.35	2.3324	25 45 25.4	5.037	19	17 56 36.46	2.2098	26 59 17.4	1.935
20	16 6 43.34	2.3339	25 50 23.4	4.894	20	17 58 54.04	2.2087	26 57 17.1	2.075
21	16 9 3.42	2.3353	25 55 12.8	4.751	21	18 1 13.26	2.2069	26 55 8.4	2.214
22	16 11 23.58	2.3367	25 59 53.5	4.607	22	18 3 31.41	2.2012	26 52 51.4	2.353
23	16 13 43.82	2.3380	S. 26 4 25.6	4.462	23	18 5 49.40	2.2003	S. 26 50 26.0	2.492
WEDNESDAY 18.					FRIDAY 20.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	16 16 4.14	2.3392	S. 26 8 49.0	4.318	0	18 8 7.20	2.2002	S. 26 47 52.4	2.630
1	16 18 24.53	2.3403	26 13 3.7	4.173	1	18 10 24.82	2.2022	26 45 10.5	2.767
2	16 20 44.98	2.3414	26 17 9.7	4.028	2	18 12 42.26	2.2001	26 42 20.4	2.903
3	16 23 5.50	2.3424	26 21 7.0	3.882	3	18 14 59.51	2.2038	26 39 22.1	3.039
4	16 25 26.07	2.3433	26 24 55.5	3.736	4	18 17 16.56	2.2026	26 36 15.7	3.174
5	16 27 46.69	2.3441	26 28 35.3	3.590	5	18 19 33.42	2.2008	26 33 1.2	3.309
6	16 30 7.36	2.3448	26 32 6.3	3.444	6	18 21 50.07	2.2000	26 29 38.6	3.444
7	16 32 28.07	2.3454	26 35 28.5	3.297	7	18 24 6.52	2.2023	26 26 8.0	3.579
8	16 34 48.81	2.3460	26 38 41.9	3.150	8	18 26 22.75	2.2008	26 23 29.4	3.711
9	16 37 9.59	2.3465	26 41 46.6	3.004	9	18 28 38.78	2.2032	26 18 42.8	3.842
10	16 39 30.39	2.3469	26 44 42.4	2.857	10	18 30 54.58	2.2016	26 14 48.4	3.972
11	16 41 51.22	2.3472	26 47 29.4	2.710	11	18 33 10.16	2.2077	26 10 46.1	4.102
12	16 44 12.06	2.3474	26 50 7.6	2.563	12	18 35 25.51	2.2038	26 6 36.1	4.232
13	16 46 32.91	2.3476	26 52 37.0	2.416	13	18 37 40.62	2.2009	26 2 18.3	4.361
14	16 48 53.77	2.3477	26 54 57.5	2.269	14	18 39 55.50	2.2000	25 57 52.8	4.489
15	16 51 14.64	2.3477	26 57 9.2	2.122	15	18 42 10.14	2.2020	25 53 19.6	4.617
16	16 53 35.49	2.3475	26 59 12.1	1.975	16	18 44 24.54	2.2080	25 48 38.8	4.744
17	16 55 56.34	2.3473	27 1 6.2	1.828	17	18 46 38.70	2.2039	25 43 50.4	4.870
18	16 58 17.16	2.3469	27 2 51.4	1.681	18	18 48 52.61	2.2008	25 38 54.4	4.995
19	17 0 37.97	2.3465	27 4 27.8	1.534	19	18 51 6.27	2.2026	25 33 51.0	5.118
20	17 2 58.74	2.3460	27 5 55.3	1.386	20	18 53 19.68	2.2012	25 28 40.2	5.242
21	17 5 19.49	2.3454	27 7 14.1	1.239	21	18 55 32.83	2.2000	25 23 22.0	5.365
22	17 7 40.19	2.3447	27 8 24.0	1.092	22	18 57 45.71	2.2026	25 17 56.4	5.487
23	17 10 0.86	2.3440	27 9 25.1	0.945	23	18 59 58.33	2.2002	25 12 23.6	5.607
24	17 12 21.47	2.3431	S. 27 10 17.4	0.798	24	19 2 10.69	2.2037	S. 25 6 43.6	5.727



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 21.					MONDAY 23.				
0	h. m. s.	s.	S. ° ' "	"	0	h. m. s.	s.	S. ° ' "	"
0	19 2 10.69	2.9037	S. 25 6 43.6	5.727	0	20 42 24.22	1.9713	S. 18 31 25.0	10.370
1	19 4 22.78	2.1992	25 0 56.4	5.846	1	20 44 22.36	1.9667	18 21 0.7	10.443
2	19 6 34.59	2.1946	24 55 2.1	5.965	2	20 46 20.22	1.9621	18 10 32.0	10.516
3	19 8 46.13	2.1901	24 49 0.7	6.082	3	20 48 17.81	1.9576	17 59 58.9	10.590
4	19 10 57.40	2.1855	24 42 52.3	6.198	4	20 50 15.13	1.9531	17 49 21.6	10.666
5	19 13 8.39	2.1809	24 36 37.0	6.314	5	20 52 12.18	1.9486	17 38 40.2	10.725
6	19 15 19.10	2.1762	24 30 14.7	6.429	6	20 54 8.96	1.9441	17 27 54.6	10.793
7	19 17 29.53	2.1714	24 23 45.6	6.543	7	20 56 5.47	1.9397	17 17 5.0	10.860
8	19 19 39.67	2.1666	24 17 9.6	6.656	8	20 58 1.72	1.9352	17 6 11.5	10.926
9	19 21 49.52	2.1618	24 10 26.9	6.768	9	20 59 57.70	1.9308	16 55 14.0	10.991
10	19 23 59.09	2.1572	24 3 37.5	6.879	10	21 1 53.43	1.9267	16 44 12.6	11.065
11	19 26 8.38	2.1523	23 56 41.6	6.988	11	21 3 48.90	1.9223	16 33 7.4	11.118
12	19 28 17.37	2.1474	23 49 39.1	7.097	12	21 5 44.11	1.9181	16 21 58.3	11.180
13	19 30 26.07	2.1426	23 42 30.0	7.205	13	21 7 39.07	1.9139	16 10 45.6	11.242
14	19 32 34.48	2.1377	23 35 14.5	7.312	14	21 9 33.78	1.9098	15 59 29.2	11.303
15	19 34 42.60	2.1328	23 27 52.6	7.417	15	21 11 28.24	1.9057	15 48 9.2	11.363
16	19 36 50.42	2.1279	23 20 24.4	7.522	16	21 13 22.46	1.9016	15 36 45.7	11.422
17	19 38 57.95	2.1230	23 12 49.9	7.627	17	21 15 16.43	1.8975	15 25 18.6	11.480
18	19 41 5.18	2.1180	23 5 9.2	7.731	18	21 17 10.16	1.8935	15 13 48.1	11.537
19	19 43 12.11	2.1131	22 57 22.3	7.833	19	21 19 3.66	1.8897	15 2 14.2	11.593
20	19 45 18.75	2.1082	22 49 29.3	7.934	20	21 20 56.92	1.8858	14 50 37.0	11.648
21	19 47 25.09	2.1033	22 41 30.2	8.034	21	21 22 49.95	1.8819	14 38 56.5	11.703
22	19 49 31.13	2.0982	22 33 25.2	8.133	22	21 24 42.75	1.8781	14 27 12.6	11.756
23	19 51 36.87	2.0932	S. 22 25 14.2	8.232	23	21 26 35.39	1.8743	S. 14 15 25.6	11.809
SUNDAY 22.					TUESDAY 24.				
0	h. m. s.	s.	S. ° ' "	"	0	h. m. s.	s.	S. ° ' "	"
0	19 53 42.32	2.0883	S. 22 16 57.3	8.329	0	21 28 27.67	1.8707	S. 14 3 35.6	11.860
1	19 55 47.47	2.0833	22 8 34.6	8.423	1	21 30 19.80	1.8670	13 51 42.5	11.911
2	19 57 52.32	2.0783	22 0 6.2	8.521	2	21 32 11.71	1.8633	13 39 46.4	11.961
3	19 59 56.86	2.0732	21 51 32.1	8.616	3	21 34 3.40	1.8596	13 27 47.3	12.010
4	20 2 1.11	2.0683	21 42 52.3	8.709	4	21 35 54.89	1.8558	13 15 45.2	12.068
5	20 4 5.06	2.0634	21 34 7.0	8.802	5	21 37 46.16	1.8520	13 3 40.3	12.105
6	20 6 8.72	2.0584	21 25 16.1	8.893	6	21 39 37.23	1.8482	12 51 32.6	12.161
7	20 8 12.07	2.0534	21 16 19.8	8.981	7	21 41 28.10	1.8442	12 39 22.1	12.197
8	20 10 15.13	2.0485	21 7 18.1	9.073	8	21 43 18.77	1.8403	12 27 8.9	12.242
9	20 12 17.89	2.0436	20 58 11.0	9.162	9	21 45 9.24	1.8366	12 14 53.1	12.286
10	20 14 20.35	2.0386	20 48 58.7	9.249	10	21 46 59.52	1.8328	12 2 34.6	12.329
11	20 16 22.52	2.0336	20 39 41.2	9.335	11	21 48 49.61	1.8292	11 50 13.6	12.372
12	20 18 24.39	2.0287	20 30 18.5	9.420	12	21 50 39.51	1.8251	11 37 49.9	12.413
13	20 20 25.97	2.0238	20 20 50.7	9.505	13	21 52 29.23	1.8212	11 25 23.9	12.454
14	20 22 27.25	2.0189	20 11 17.9	9.589	14	21 54 18.77	1.8172	11 12 55.4	12.494
15	20 24 28.24	2.0141	20 1 40.1	9.673	15	21 56 8.13	1.8132	11 0 24.6	12.533
16	20 26 28.94	2.0093	19 51 57.3	9.753	16	21 57 57.32	1.8151	10 47 51.4	12.571
17	20 28 29.35	2.0045	19 42 9.7	9.834	17	21 59 46.34	1.8156	10 35 16.0	12.609
18	20 30 29.48	1.9997	19 32 17.2	9.914	18	22 1 35.19	1.8126	10 22 38.4	12.646
19	20 32 29.31	1.9949	19 22 19.9	9.993	19	22 3 23.88	1.8102	10 9 58.6	12.682
20	20 34 28.86	1.9902	19 12 18.0	10.070	20	22 5 12.41	1.8075	9 57 16.6	12.717
21	20 36 28.13	1.9853	19 2 11.5	10.147	21	22 7 0.78	1.8050	9 44 32.6	12.751
22	20 38 27.10	1.9806	18 52 0.4	10.223	22	22 8 49.01	1.8023	9 31 46.3	12.784
23	20 40 25.80	1.9760	18 41 44.9	10.297	23	22 10 37.08	1.8000	9 18 58.5	12.817
24	20 42 24.22	1.9713	S. 18 31 25.0	10.370	24	22 12 25.01	1.7976	S. 9 6 8.5	12.849



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 25.					FRIDAY 27.				
0	h. m. s.	s.	S. ° ' "	"	0	h. m. s.	s.	N. ° ' "	"
1	22 12 25.01	1.7976	S. 9 6 8.5	12.849	1	23 37 8.61	1.7680	N. 1 33 34.0	12.886
2	22 14 12.79	1.7982	8 53 16.6	12.880	2	23 38 54.11	1.7688	1 47 6.1	12.883
3	22 16 0.44	1.7929	8 40 22.9	12.910	3	23 40 39.67	1.7697	2 0 38.0	12.880
4	22 17 47.96	1.7908	8 27 27.4	12.940	4	23 42 25.28	1.7697	2 14 9.7	12.886
5	22 19 35.34	1.7887	8 14 30.1	12.969	5	23 44 10.95	1.7618	2 27 41.2	12.881
6	22 21 22.59	1.7866	8 1 31.1	12.997	6	23 45 56.69	1.7620	2 41 12.3	12.815
7	22 23 9.73	1.7845	7 48 30.4	12.021	7	23 47 42.50	1.7641	2 54 43.1	12.810
8	22 24 56.74	1.7825	7 35 28.1	12.051	8	23 49 28.38	1.7683	3 8 13.5	12.804
9	22 26 43.63	1.7806	7 22 24.2	12.077	9	23 51 14.34	1.7687	3 21 43.5	12.487
10	22 28 30.41	1.7788	7 9 18.8	12.103	10	23 53 0.38	1.7681	3 35 13.1	12.480
11	22 30 17.09	1.7770	6 56 11.9	12.127	11	23 54 46.51	1.7686	3 48 42.2	12.480
12	22 32 3.66	1.7753	6 43 3.6	12.151	12	23 56 32.73	1.7711	4 2 10.7	12.471
13	22 33 50.13	1.7737	6 29 53.8	12.174	13	23 58 19.04	1.7737	4 15 38.7	12.461
14	22 35 36.50	1.7721	6 16 42.7	12.198	14	0 0 5.45	1.7744	4 29 6.0	12.450
15	22 37 22.78	1.7706	6 3 30.3	12.217	15	0 1 51.97	1.7728	4 42 32.7	12.438
16	22 39 8.97	1.7691	5 50 16.6	12.238	16	0 3 38.59	1.7720	4 55 58.6	12.426
17	22 40 55.07	1.7677	5 37 1.7	12.258	17	0 5 25.33	1.7690	5 9 23.8	12.413
18	22 42 41.09	1.7663	5 23 45.6	12.278	18	0 7 12.19	1.7680	5 22 48.2	12.399
19	22 44 27.03	1.7650	5 10 28.3	12.297	19	0 8 59.17	1.7640	5 36 11.7	12.386
20	22 46 12.90	1.7639	4 57 9.9	12.316	20	0 10 46.27	1.7651	5 49 34.4	12.370
21	22 47 58.70	1.7628	4 43 50.5	12.332	21	0 12 33.50	1.7628	6 2 56.1	12.354
22	22 49 44.43	1.7617	4 30 30.1	12.348	22	0 14 20.87	1.7606	6 16 16.9	12.337
23	22 51 30.10	1.7607	4 17 8.7	12.364	23	0 16 8.37	1.7580	6 29 36.6	12.320
24	22 53 15.71	1.7597	S. 4 3 46.3	12.380	24	0 17 56.02	1.7564	N. 6 42 55.3	12.308
THURSDAY 26.					SATURDAY 28.				
0	22 55 1.26	1.7587	S. 3 50 23.1	12.394	0	0 19 43.82	1.7970	N. 6 56 12.9	12.281
1	22 56 46.76	1.7579	3 36 59.1	12.407	1	0 21 31.77	1.8006	7 9 29.3	12.264
2	22 58 32.22	1.7572	3 23 34.2	12.420	2	0 23 19.88	1.8032	7 22 44.6	12.244
3	23 0 17.63	1.7565	3 10 8.6	12.433	3	0 25 8.15	1.8059	7 35 58.6	12.223
4	23 2 3.01	1.7560	2 56 42.2	12.446	4	0 26 56.58	1.8087	7 49 11.4	12.201
5	23 3 48.35	1.7564	2 43 15.2	12.456	5	0 28 45.18	1.8115	8 2 22.8	12.179
6	23 5 33.66	1.7549	2 29 47.5	12.466	6	0 30 33.96	1.8143	8 15 32.9	12.156
7	23 7 18.94	1.7545	2 16 19.2	12.476	7	0 32 22.92	1.8175	8 28 41.5	12.132
8	23 9 4.20	1.7532	2 2 50.3	12.485	8	0 34 12.06	1.8206	8 41 48.7	12.107
9	23 10 49.44	1.7520	1 49 20.9	12.493	9	0 36 1.38	1.8236	8 54 54.4	12.081
10	23 12 34.66	1.7507	1 35 51.1	12.501	10	0 37 50.90	1.8270	9 7 58.5	12.054
11	23 14 19.88	1.7506	1 22 20.8	12.508	11	0 39 40.62	1.8302	9 21 1.0	12.027
12	23 16 5.09	1.7505	1 8 50.1	12.514	12	0 41 30.54	1.8337	9 34 1.8	12.000
13	23 17 50.29	1.7504	0 55 19.0	12.520	13	0 43 20.66	1.8373	9 47 0.9	12.971
14	23 19 35.50	1.7505	0 41 47.7	12.524	14	0 45 11.00	1.8407	9 59 58.3	12.943
15	23 21 20.72	1.7507	0 28 16.1	12.528	15	0 47 1.55	1.8443	10 12 53.9	12.912
16	23 23 5.95	1.7500	0 14 44.3	12.532	16	0 48 52.31	1.8480	10 25 47.7	12.881
17	23 24 51.19	1.7541	S. 0 1 12.3	12.538	17	0 50 43.31	1.8518	10 38 39.6	12.848
18	23 26 36.44	1.7544	N. 0 12 19.9	12.537	18	0 52 34.53	1.8556	10 51 29.5	12.815
19	23 28 21.72	1.7540	0 25 52.2	12.539	19	0 54 25.98	1.8595	11 4 17.4	12.782
20	23 30 7.03	1.7564	0 39 24.6	12.540	20	0 56 17.67	1.8633	11 17 3.3	12.748
21	23 31 52.37	1.7560	0 52 57.0	12.540	21	0 58 9.60	1.8676	11 29 47.1	12.712
22	23 33 37.74	1.7565	1 6 29.4	12.539	22	1 0 1.78	1.8717	11 42 28.7	12.676
23	23 35 23.15	1.7572	1 20 1.8	12.538	23	1 1 54.21	1.8759	11 55 8.1	12.639
24	23 37 8.61	1.7580	N. 1 33 34.0	12.536	24	1 3 46.89	1.8802	N. 12 7 45.1	12.601



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 29.					TUESDAY 31.				
0	h. m. s.	s.	N. O. ' "	"	0	h. m. s.	s.	N. O. ' "	"
1	1 3 46.89	1.8805	12 7 45.1	12.601	1	2 40 18.07	2.1657	21 10 2.8	9.586
2	1 5 39.84	1.8816	12 20 19.9	12.583	2	2 42 28.23	2.1730	21 19 34.2	9.476
3	1 7 33.04	1.8826	12 32 52.4	12.562	3	2 44 38.82	2.1803	21 28 59.9	9.362
4	1 9 26.51	1.8835	12 45 22.5	12.539	4	2 46 49.86	2.1877	21 38 20.0	9.247
5	1 11 20.26	1.8841	12 57 50.1	12.513	5	2 49 1.34	2.1951	21 47 34.3	9.131
6	1 13 14.28	1.8847	13 10 15.2	12.487	6	2 51 13.27	2.2025	21 56 42.8	9.008
7	1 15 8.59	1.8852	13 22 37.8	12.458	7	2 53 25.64	2.2099	22 5 45.4	8.884
8	1 17 3.18	1.8857	13 34 57.8	12.427	8	2 55 38.46	2.2174	22 14 42.0	8.758
9	1 18 58.06	1.8862	13 47 15.1	12.393	9	2 57 51.74	2.2249	22 23 32.5	8.631
10	1 20 53.24	1.8867	13 59 29.6	12.357	10	3 0 5.46	2.2323	22 32 16.8	8.502
11	1 22 48.72	1.8871	14 11 41.3	12.319	11	3 2 19.64	2.2401	22 40 54.9	8.368
12	1 24 44.50	1.8875	14 23 50.2	12.279	12	3 4 34.27	2.2476	22 49 26.5	8.232
13	1 26 40.58	1.8879	14 35 56.1	12.237	13	3 6 49.36	2.2552	22 57 51.7	8.097
14	1 28 36.98	1.8883	14 47 59.0	12.193	14	3 9 4.90	2.2628	23 6 10.4	7.960
15	1 30 33.69	1.8887	14 59 58.9	12.147	15	3 11 20.90	2.2705	23 14 22.5	7.821
16	1 32 30.72	1.8891	15 11 55.7	12.100	16	3 13 37.36	2.2781	23 22 28.1	7.680
17	1 34 28.08	1.8895	15 23 49.4	12.051	17	3 15 54.28	2.2857	23 30 26.8	7.537
18	1 36 25.77	1.8899	15 35 39.8	12.001	18	3 18 11.65	2.2934	23 38 18.6	7.403
19	1 38 23.79	1.8903	15 47 26.9	11.950	19	3 20 29.48	2.3010	23 46 3.4	7.268
20	1 40 22.14	1.8907	15 59 10.7	11.898	20	3 22 47.77	2.3086	23 53 41.2	7.130
21	1 42 20.84	1.8911	16 10 51.1	11.845	21	3 25 6.52	2.3163	24 1 11.8	7.000
22	1 44 19.88	1.8915	16 22 28.0	11.791	22	3 27 25.73	2.3239	24 8 35.2	6.868
23	1 46 19.27	1.8919	16 34 1.4	11.736	23	3 29 45.39	2.3315	24 15 51.3	6.736
24	1 48 19.02	1.8923	N.16 45 31.2	11.680	24	3 32 5.51	2.3391	N.24 22 59.9	6.602
MONDAY 30.					WEDNESDAY, FEBRUARY 1.				
0	1 50 19.12	2.0048	N.16 56 57.3	11.601	0	3 34 26.08	2.3467	N.24 30 1.0	6.466
1	1 52 19.58	2.0108	17 8 19.7	11.512	PHASES OF THE MOON.				
2	1 54 20.41	2.0169	17 19 38.3	11.423	Day. h. m.				
3	1 56 21.60	2.0231	17 30 53.0	11.333	○ Full Moon, . . .	8	3 23.4		
4	1 58 23.17	2.0293	17 42 3.8	11.242	☾ Last Quarter, . .	14	18 58.7		
5	2 0 25.12	2.0356	17 53 10.6	11.151	● New Moon, . . .	22	12 16.7		
6	2 2 27.44	2.0420	18 4 13.3	11.060	☾ First Quarter, . .	30	17 10.9		
7	2 4 30.15	2.0484	18 15 11.9	10.969	Day. h.				
8	2 6 33.25	2.0548	18 26 6.2	10.878	☾ Perigee, . . . .	9	14.8		
9	2 8 36.73	2.0614	18 36 56.3	10.788	☾ Apogee, . . . .	25	5.5		
10	2 10 40.61	2.0680	18 47 42.0	10.723					
11	2 12 44.89	2.0747	18 58 23.2	10.630					
12	2 14 49.57	2.0814	19 9 0.0	10.574					
13	2 16 54.65	2.0881	19 19 32.2	10.498					
14	2 19 0.14	2.0949	19 29 59.8	10.420					
15	2 21 6.04	2.1017	19 40 22.6	10.340					
16	2 23 12.35	2.1085	19 50 40.6	10.260					
17	2 25 19.08	2.1153	20 0 53.8	10.178					
18	2 27 26.22	2.1220	20 11 2.0	10.093					
19	2 29 33.79	2.1287	20 21 5.2	10.010					
20	2 31 41.79	2.1355	20 31 3.2	9.924					
21	2 33 50.21	2.1420	20 40 56.1	9.837					
22	2 35 59.06	2.1513	20 50 43.7	9.749					
23	2 38 8.35	2.1584	21 0 26.0	9.660					
24	2 40 18.07	2.1657	N.21 10 2.8	9.568					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	SUN W.	90 33 29	3339	91 57 7	3316	93 21 0	3303	94 45 8	3289
	Venus W.	67 22 21	3412	68 44 27	3400	70 6 44	3396	71 29 16	3373
	Fomalhaut W.	46 2 59	3675	47 20 13	3677	48 38 18	3662	49 57 12	3541
	Aldebaran E.	57 42 41	3045	56 13 24	3033	54 43 50	3027	53 14 17	3020
	Jupiter E.	100 32 3	2901	98 59 45	2899	97 27 12	2878	95 54 25	2865
2	SUN W.	101 49 54	3215	103 15 45	3200	104 41 54	3183	106 8 23	3167
	Venus W.	78 26 4	3297	79 50 19	3281	81 14 53	3265	82 39 46	3247
	Fomalhaut W.	56 42 25	3360	58 5 27	3329	59 29 5	3298	60 53 19	3268
	Aldebaran E.	45 43 37	2981	44 13 1	2975	42 42 17	2969	41 11 26	2964
	Pollux E.	87 28 32	2858	85 55 19	2843	84 21 47	2828	82 47 55	2813
3	Jupiter E.	88 6 18	2798	86 31 47	2784	84 56 58	2769	83 21 49	2753
	SUN W.	113 25 59	3086	114 54 36	3080	116 23 35	3040	117 52 58	3022
	Venus W.	89 49 22	3157	91 16 23	3133	92 43 47	3119	94 11 34	3100
	Fomalhaut W.	68 3 1	3129	69 30 35	3103	70 58 41	3078	72 27 17	3054
	α Pegasi W.	45 28 32	3056	46 57 36	3022	48 27 21	2989	49 57 47	2966
4	Pollux E.	74 53 30	2732	73 17 33	2715	71 41 13	2696	70 4 30	2681
	Jupiter E.	75 20 53	2673	73 43 37	2655	72 5 56	2638	70 27 53	2621
	Saturn E.	109 15 15	2704	107 38 41	2687	106 1 44	2669	104 24 23	2652
	SUN W.	125 25 51	2924	126 57 40	2904	128 29 54	2884	130 2 33	2865
	Venus W.	101 36 28	3000	103 6 41	2980	104 37 19	2959	106 8 23	2939
5	Fomalhaut W.	79 57 42	2938	81 29 12	2916	83 1 10	2895	84 33 35	2876
	α Pegasi W.	57 39 34	2813	59 13 45	2785	60 48 32	2760	62 23 53	2736
	Pollux E.	61 55 6	2698	60 16 1	2675	58 36 32	2657	56 56 38	2640
	Jupiter E.	62 11 38	2581	60 31 8	2513	58 50 13	2495	57 8 53	2477
	Saturn E.	96 11 34	2561	94 31 45	2543	92 51 31	2524	91 10 51	2505
6	Fomalhaut W.	92 21 59	2782	93 56 51	2765	95 32 5	2749	97 7 40	2724
	α Pegasi W.	70 28 45	2617	72 7 17	2595	73 46 19	2574	75 25 50	2558
	α Arietis W.	27 4 27	2494	28 45 49	2480	30 27 46	2445	32 10 17	2422
	Pollux E.	48 31 5	2453	46 48 46	2437	45 6 4	2421	43 22 59	2405
	Jupiter E.	48 35 42	2385	46 51 48	2368	45 7 28	2350	43 22 42	2332
7	Saturn E.	82 41 2	2413	80 57 46	2395	79 14 4	2378	77 29 57	2359
	Regulus E.	85 19 36	2427	83 36 40	2410	81 53 19	2391	80 9 32	2373
	α Pegasi W.	83 50 22	2456	85 32 35	2441	87 15 11	2424	88 58 11	2410
	α Arietis W.	40 50 42	2319	42 36 14	2300	44 22 12	2283	46 8 36	2265
	Jupiter E.	34 32 37	2249	32 45 23	2234	30 57 45	2216	29 9 46	2204
8	Saturn E.	68 43 1	2274	66 56 24	2259	65 9 23	2243	63 21 59	2227
	Regulus E.	71 24 16	2288	69 37 59	2272	67 51 19	2256	66 4 15	2241
	α Arietis W.	55 6 41	2189	56 55 25	2175	58 44 30	2163	60 33 54	2151
	Aldebaran W.	24 39 21	2567	26 19 1	2507	28 0 5	2455	29 42 22	2410
	Saturn E.	54 19 30	2156	52 29 59	2146	50 40 10	2134	48 50 3	2122
9	Regulus E.	57 3 26	2171	55 14 15	2159	53 24 45	2147	51 34 57	2136
	Spica E.	111 6 0	2174	109 16 54	2161	107 27 27	2149	105 37 42	2137
	α Arietis W.	69 45 8	2100	71 36 7	2092	73 27 18	2085	75 18 41	2078
	Aldebaran W.	38 27 16	2259	40 14 16	2238	42 1 47	2220	43 49 45	2203
	Saturn E.	39 35 37	2073	37 44 4	2072	35 52 21	2066	34 0 30	2061
10	Regulus E.	42 23 2	2089	40 30 46	2082	38 39 19	2075	36 47 42	2070
	Spica E.	96 24 55	2089	94 33 39	2081	92 42 11	2075	90 50 33	2068



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXh.	P. L. of Diff.
			<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
1	SUN	W.	96 9 32	2376	97 34 12	2261	98 59 9	2247	100 24 23	2232
	Venus	W.	72 52 4	2338	74 15 9	2344	75 38 30	2329	77 2 8	2313
	Fomalhaut	W.	51 16 51	2502	52 37 13	2464	53 58 17	2436	55 20 2	2394
	Aldebaran	E.	51 44 29	2011	50 14 30	2004	48 44 22	2096	47 14 4	2088
	Jupiter	E.	94 21 21	2232	92 48 1	2239	91 14 24	2236	89 40 30	2212
2	SUN	W.	107 35 12	2149	109 2 22	2132	110 29 53	2114	111 57 45	2096
	Venus	W.	84 4 59	2230	85 30 33	2212	86 56 28	2194	88 22 44	2176
	Fomalhaut	W.	62 18 8	2238	63 43 32	2210	65 9 29	2182	66 35 59	2164
	Aldebaran	E.	39 40 28	2299	38 9 24	2297	36 38 17	2296	35 7 9	2286
	Pollux	E.	81 13 44	2197	79 39 12	2181	78 4 19	2165	76 29 5	2149
	Jupiter	E.	81 46 20	2138	80 10 30	2122	78 34 19	2106	76 57 47	2089
3	SUN	W.	119 22 44	2002	120 52 54	2083	122 23 28	2068	123 54 27	2048
	Venus	W.	95 39 44	2080	97 8 18	2060	98 37 17	2040	100 6 40	2020
	Fomalhaut	W.	73 56 23	2030	75 25 59	2008	76 56 5	2082	78 26 39	2060
	α Pegasi	W.	51 28 52	2277	53 0 36	2268	54 32 58	2266	56 5 58	2240
	Pollux	E.	68 27 24	2263	66 49 55	2246	65 12 3	2228	63 32 46	2211
	Jupiter	E.	68 49 27	2204	67 10 37	2205	65 31 21	2209	63 51 42	2200
	Saturn	E.	102 46 38	2234	101 8 29	2215	99 29 55	2206	97 50 57	2200
4	SUN	W.	131 35 37	2245	133 9 7	2225	134 43 3	2206	136 17 24	2185
	Venus	W.	107 39 52	2219	109 11 47	2208	110 44 8	2278	112 16 55	2266
	Fomalhaut	W.	86 6 26	2255	87 39 42	2235	89 13 24	2217	90 47 30	2199
	α Pegasi	W.	63 59 47	2109	65 36 14	2085	67 13 13	2062	68 50 44	2040
	Pollux	E.	55 16 20	2222	53 35 38	2204	51 54 31	2187	50 13 0	2170
	Jupiter	E.	55 27 7	2458	53 44 54	2440	52 2 16	2422	50 19 12	2408
	Saturn	E.	89 29 45	2487	87 48 13	2469	86 6 16	2450	84 23 52	2431
5	Fomalhaut	W.	98 43 35	2119	100 19 49	2106	101 56 20	2094	103 33 8	2084
	α Pegasi	W.	77 5 50	2232	78 46 19	2213	80 27 14	2194	82 8 35	2176
	α Arietis	W.	33 53 21	2400	35 36 56	2378	37 21 2	2357	39 5 38	2338
	Pollux	E.	41 39 32	2290	39 55 43	2275	38 11 33	2262	36 27 3	2246
	Jupiter	E.	41 37 31	2215	39 51 54	2209	38 5 53	2292	36 19 27	2286
	Saturn	E.	75 45 24	2242	74 0 25	2234	72 15 1	2208	70 29 13	2201
	Regulus	E.	78 25 19	2256	76 40 41	2238	74 55 37	2222	73 10 9	2204
6	α Pegasi	W.	90 41 32	2294	92 25 15	2280	94 9 19	2267	95 53 41	2254
	α Arietis	W.	47 55 26	2249	49 42 40	2233	51 30 18	2218	53 18 19	2204
	Jupiter	E.	27 21 26	2190	25 39 44	2176	23 43 41	2163	21 54 21	2154
	Saturn	E.	61 34 12	2212	59 46 3	2198	57 57 32	2184	56 8 41	2171
	Regulus	E.	64 16 48	2226	62 28 59	2212	60 40 49	2198	58 52 16	2184
7	α Arietis	W.	62 23 36	2139	64 13 35	2128	66 3 51	2116	67 54 22	2109
	Aldebaran	W.	31 25 42	2271	33 9 58	2258	34 55 2	2246	36 40 50	2232
	Saturn	E.	46 59 39	2112	45 9 0	2103	43 18 6	2094	41 26 58	2086
	Regulus	E.	49 44 53	2125	47 54 32	2115	46 3 56	2106	44 13 6	2097
	Spica	E.	103 47 40	2127	101 57 21	2116	100 6 47	2107	98 15 58	2097
8	α Arietis	W.	77 10 14	2073	79 1 55	2067	80 53 45	2062	82 45 42	2060
	Aldebaran	W.	45 38 8	2189	47 26 52	2177	49 15 54	2163	51 5 14	2156
	Saturn	E.	32 8 31	2067	30 16 25	2064	28 24 15	2062	26 32 2	2062
	Regulus	E.	34 55 57	2065	33 4 4	2061	31 12 5	2058	29 20 1	2056
	Spica	E.	88 58 45	2062	87 6 48	2067	85 14 43	2063	83 22 32	2060



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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
9	$\alpha$ Arietis W.	84 37 44	2007	86 29 50	2054	88 22 0	2088	90 14 12	2052
	Aldebaran W.	52 54 48	2148	54 44 34	2141	56 34 30	2125	58 24 36	2131
	Spica E.	81 30 16	2047	79 37 55	2045	77 45 31	2043	75 53 5	2043
	Mars E.	106 12 18	2261	104 25 6	2248	102 37 50	2247	100 50 32	2247
10	Aldebaran W.	67 36 14	2124	69 26 37	2125	71 16 57	2127	73 7 15	2131
	Jupiter W.	25 4 7	2014	26 57 20	2016	28 50 30	2019	30 43 35	2022
	Pollux W.	25 2 41	2127	26 52 59	2120	28 43 28	2116	30 34 2	2114
	Spica E.	66 31 4	2061	64 38 49	2055	62 46 40	2050	60 54 37	2054
	Mars E.	91 54 4	2252	90 6 54	2256	88 19 49	2260	86 32 50	2264
11	Aldebaran W.	82 17 4	2158	84 6 35	2166	85 55 54	2174	87 45 1	2182
	Jupiter W.	40 7 4	2053	41 59 16	2061	43 51 16	2068	45 43 4	2077
	Pollux W.	39 46 57	2126	41 37 17	2130	43 27 30	2137	45 17 33	2144
	Spica E.	51 36 36	2098	49 45 33	2107	47 54 44	2115	46 4 8	2125
	Mars E.	77 40 3	2299	75 54 2	2308	74 8 14	2317	72 22 40	2327
	Sun E.	140 16 12	2403	138 32 41	2410	136 49 21	2419	135 6 14	2429
12	Jupiter W.	54 58 26	2126	56 48 43	2139	58 38 42	2151	60 28 24	2163
	Pollux W.	54 24 49	2188	56 13 34	2199	58 2 3	2210	59 50 16	2221
	Saturn W.	20 28 7	2190	22 17 4	2187	24 5 51	2185	25 54 26	2204
	Spica E.	36 55 7	2182	35 6 12	2195	33 17 37	2208	31 29 22	2222
	Mars E.	63 38 39	2395	61 54 43	2397	60 11 4	2410	58 27 44	2425
	Antares E.	82 39 28	2165	80 50 8	2177	79 1 6	2188	77 12 21	2201
	Sun E.	126 34 10	2482	124 52 32	2495	123 11 12	2507	121 30 9	2520
13	Jupiter W.	69 32 17	2226	71 20 6	2239	73 7 35	2252	74 54 45	2266
	Pollux W.	68 46 59	2282	70 33 25	2290	72 19 31	2309	74 5 18	2322
	Saturn W.	34 53 41	2250	36 40 41	2271	38 27 23	2284	40 13 46	2296
	Regulus W.	31 45 59	2273	33 32 38	2286	35 18 58	2299	37 4 59	2312
	Mars E.	49 56 15	2300	48 15 2	2316	46 34 11	2333	44 53 44	2350
	Antares E.	68 13 16	2264	66 26 24	2276	64 39 52	2291	62 53 40	2305
	Sun E.	113 9 26	2366	111 30 15	2393	109 51 23	2417	108 12 51	2452
14	Jupiter W.	83 45 34	2335	85 30 43	2348	87 15 32	2362	89 0 1	2375
	Pollux W.	82 49 19	2390	84 33 8	2404	86 16 37	2416	87 59 46	2431
	Saturn W.	49 1 1	2362	50 45 30	2375	52 29 40	2389	54 13 30	2403
	Regulus W.	45 50 15	2379	47 34 20	2393	49 18 5	2407	51 1 30	2420
	Mars E.	36 37 34	2644	34 59 38	2654	33 22 10	2666	31 45 11	2709
	Antares E.	54 7 42	2374	52 23 30	2388	50 39 38	2403	48 56 7	2417
	Sun E.	100 5 9	2706	98 28 37	2721	96 52 24	2736	95 16 32	2761
15	Jupiter W.	97 37 33	2443	99 20 6	2457	101 2 19	2470	102 44 14	2484
	Pollux W.	96 30 39	2500	98 11 52	2515	99 52 45	2527	101 33 20	2540
	Saturn W.	62 47 54	2470	64 29 50	2483	66 11 28	2496	67 52 47	2509
	Regulus W.	59 33 46	2496	61 15 18	2502	62 56 27	2515	64 37 20	2527
	Antares E.	40 23 25	2483	38 41 51	2498	37 0 35	2512	35 19 38	2524
	Sun E.	87 22 3	2625	85 48 7	2639	84 14 29	2653	82 41 10	2667
16	Jupiter W.	111 9 17	2546	112 49 26	2559	114 29 17	2571	116 8 52	2583
	Saturn W.	76 14 56	2572	77 54 30	2584	79 33 47	2596	81 12 48	2607
	Regulus W.	72 57 16	2591	74 36 23	2603	76 15 14	2615	77 53 48	2627
	Spica W.	19 4 18	2640	20 42 19	2646	22 20 12	2652	23 57 57	2656
	Sun E.	74 59 5	2686	73 27 32	2690	71 56 16	2692	70 25 16	2676



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9	$\alpha$ Arietis W.	92 6 26	3032	93 58 39	3033	95 50 51	3054	97 43 1	3057
	Aldebaran W.	60 14 48	3127	62 5 6	3135	63 55 27	3134	65 45 50	3123
	Spica E.	74 0 38	3044	72 8 12	3044	70 15 47	3046	68 23 24	3048
	Mars E.	99 3 13	3247	97 15 54	3246	95 28 35	3247	93 41 18	3249
10	Aldebaran W.	74 57 27	3135	76 47 33	3139	78 37 32	3145	80 27 23	3151
	Jupiter W.	32 36 33	3039	34 29 24	3033	36 23 7	3039	38 14 41	3046
	Pollux W.	32 24 40	3113	34 15 19	3115	36 5 56	3116	37 56 30	3121
	Spica E.	59 2 42	3099	57 10 55	3076	55 19 18	3092	53 27 51	3090
	Mars E.	84 45 58	3270	82 59 14	3277	81 12 40	3253	79 26 16	3291
11	Aldebaran W.	89 33 55	3192	91 23 34	3202	93 10 58	3212	94 59 7	3224
	Jupiter W.	47 34 38	3096	49 25 58	3095	51 17 3	3107	53 7 52	3117
	Pollux W.	47 7 25	3151	48 57 6	3160	50 46 31	3169	52 35 49	3178
	Spica E.	44 13 47	3136	42 23 42	3145	40 33 53	3157	38 44 21	3169
	Mars E.	70 37 20	3237	68 52 15	3249	67 7 26	3260	65 22 54	3272
	SUN E.	133 23 20	3438	131 40 40	3446	129 58 14	3460	128 16 4	3471
12	Jupiter W.	62 17 48	3176	64 6 53	3187	65 55 40	3200	67 44 8	3212
	Pollux W.	61 38 12	3233	63 25 51	3245	65 13 12	3257	67 0 15	3270
	Saturn W.	27 42 48	3214	29 30 55	3224	31 18 47	3235	33 6 23	3247
	Spica E.	29 41 20	3238	27 53 58	3253	26 6 50	3270	24 20 7	3287
	Mars E.	56 44 45	3439	55 2 6	3454	53 19 48	3469	51 37 51	3484
	Antares E.	75 23 55	3213	73 35 47	3225	71 47 57	3239	70 0 27	3251
	SUN E.	119 49 23	3333	118 8 56	3346	116 28 47	3360	114 48 57	3374
13	Jupiter W.	76 41 35	3279	78 28 5	3288	80 14 15	3307	82 0 4	3321
	Pollux W.	75 50 46	3335	77 35 54	3349	79 20 42	3362	81 5 11	3377
	Saturn W.	41 59 51	3309	43 45 38	3322	45 31 5	3336	47 16 12	3348
	Regulus W.	39 50 41	3325	40 36 4	3339	42 21 7	3352	44 5 51	3366
	Mars E.	43 13 40	3267	41 34 0	3286	39 54 46	3304	38 15 57	3324
	Antares E.	61 7 48	3319	59 22 16	3333	57 37 5	3347	55 52 13	3361
	SUN E.	106 34 39	3346	104 56 47	3361	103 19 15	3375	101 42 2	3390
14	Jupiter W.	90 44 10	3389	92 28 0	3408	94 11 31	3417	95 54 41	3430
	Pollux W.	89 42 36	3445	91 25 6	3460	93 7 16	3473	94 49 7	3487
	Saturn W.	55 57 1	3418	57 40 13	3430	59 23 5	3443	61 5 39	3456
	Regulus W.	52 44 36	3434	54 27 22	3448	56 9 49	3461	57 51 57	3475
	Mars E.	30 8 43	3733	28 32 47	3756	26 57 24	3788	25 22 38	3818
	Antares E.	47 12 55	3431	45 30 4	3444	43 47 31	3456	42 5 18	3472
	SUN E.	93 40 59	3765	92 5 46	3780	90 30 52	3795	88 56 18	3816
15	Jupiter W.	104 25 50	3497	106 7 8	3510	107 48 8	3522	109 28 51	3534
	Pollux W.	103 13 37	3554	104 53 35	3567	106 33 15	3580	108 12 37	3593
	Saturn W.	69 33 48	3522	71 14 31	3534	72 54 57	3547	74 35 5	3559
	Regulus W.	66 17 55	3540	67 58 12	3553	69 38 11	3566	71 17 52	3579
	Antares E.	33 38 58	3537	31 58 36	3550	30 18 32	3561	28 38 44	3573
	SUN E.	81 8 9	3892	79 35 27	3906	78 3 2	3909	76 30 55	3923
16	Jupiter W.	117 48 10	3595	119 27 12	3607	121 5 58	3618	122 44 28	3629
	Saturn W.	82 51 33	3619	84 30 2	3630	86 8 16	3641	87 40 14	3653
	Regulus W.	79 32 6	3640	81 10 7	3651	83 47 53	3662	84 25 24	3673
	Spica W.	25 35 33	3685	27 12 58	3675	28 50 12	3683	30 27 15	3692
	SUN E.	68 54 33	3983	67 24 5	3991	65 53 53	3914	64 23 57	3925



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Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
17	Saturn W.	89 23 57	2664	91 1 25	2674	92 38 40	2685	94 15 40	2695
	Regulus W.	86 2 40	2685	87 39 41	2685	89 16 28	2706	90 53 0	2716
	Spica W.	32 4 6	2701	33 40 45	2710	35 17 11	2719	36 53 25	2729
	SUN E.	62 54 15	3063	61 24 49	3048	59 55 36	3000	58 26 38	3072
18	Saturn W.	102 17 18	2744	103 52 59	2754	105 28 27	2763	107 3 43	2772
	Spica W.	44 51 31	2775	46 26 33	2783	48 1 23	2792	49 36 2	2801
	Mars W.	15 36 32	3309	17 0 33	3286	18 25 24	3286	19 50 51	3312
	SUN E.	51 5 11	3126	49 37 33	3135	48 10 6	3146	46 42 52	3156
19	Spica W.	57 26 31	2841	59 0 6	2849	60 33 30	2856	62 6 45	2864
	Mars W.	27 2 52	3167	28 29 41	3163	29 56 34	3163	31 23 27	3164
	SUN E.	39 29 33	3202	38 3 26	3211	36 37 30	3219	35 11 43	3226
25	SUN W.	27 1 32	3463	28 22 35	3466	29 43 37	3468	31 4 37	3468
	α Arietis E.	64 0 51	3093	62 32 33	3065	61 4 17	3096	59 36 3	3096
	Aldebaran E.	96 13 2	3146	94 45 47	3146	93 18 33	3146	91 51 19	3146
26	SUN W.	37 49 33	3468	39 10 33	3466	40 31 35	3466	41 52 38	3468
	α Arietis E.	52 15 13	3101	50 47 5	3102	49 18 58	3101	47 50 50	3102
	Aldebaran E.	84 35 21	3148	83 8 10	3148	81 40 58	3147	80 13 45	3146
27	SUN W.	48 38 28	3480	49 59 48	3446	51 21 13	3443	52 42 42	3438
	Venus W.	19 59 36	3007	21 18 3	3097	22 36 41	3087	23 55 30	3076
	α Arietis E.	40 30 5	3008	39 1 53	3006	37 33 40	3006	36 5 25	3004
	Aldebaran E.	72 57 21	3138	71 29 58	3137	70 2 33	3134	68 35 5	3133
	Jupiter E.	112 38 57	3020	111 9 9	3018	109 39 18	3014	108 9 22	3009
28	SUN W.	59 31 36	3408	60 53 44	3400	62 16 0	3393	63 38 24	3385
	Venus W.	30 32 16	3329	31 52 8	3319	33 12 11	3310	34 32 24	3299
	Aldebaran E.	61 16 52	3116	59 49 2	3119	58 21 7	3108	56 53 7	3106
	Jupiter E.	100 38 13	2992	99 7 38	2977	97 36 56	2970	96 6 6	2963
	Pollux E.	103 20 49	3040	101 51 26	3034	100 21 55	3026	98 52 15	3019
29	SUN W.	70 32 56	3338	71 56 24	3327	73 20 4	3316	74 43 57	3304
	Venus W.	41 16 25	3446	42 37 50	3433	43 59 29	3422	45 21 21	3408
	Aldebaran E.	49 31 55	3084	48 3 26	3080	46 34 52	3077	45 6 14	3073
	Jupiter E.	88 29 25	2820	86 57 31	2810	85 25 25	2801	83 53 7	2801
	Pollux E.	91 21 25	2976	89 50 42	2966	88 19 46	2955	86 48 37	2945
30	SUN W.	81 46 59	3287	83 12 22	3225	84 38 2	3209	86 4 0	3195
	Venus W.	52 14 29	3339	53 37 55	3325	55 1 38	3309	56 25 39	3294
	α Pegasi W.	41 31 7	3366	42 55 58	3351	44 21 31	3195	45 47 46	3156
	Aldebaran E.	37 42 17	3065	36 13 25	3066	34 44 36	3071	33 15 51	3078
	Jupiter E.	76 8 3	2831	74 34 15	2818	73 0 11	2806	71 25 51	2792
	Pollux E.	79 9 22	2886	77 36 45	2873	76 3 51	2869	74 30 40	2846
	Saturn E.	111 47 16	2847	110 13 49	2834	108 40 5	2821	107 6 4	2807
31	SUN W.	93 18 28	3113	94 46 22	3085	96 14 38	3078	97 43 15	3060
	Venus W.	63 30 30	3209	64 56 29	3190	66 22 50	3173	67 49 33	3153
	α Pegasi W.	53 8 7	3020	54 37 55	2993	56 8 16	2987	57 39 10	2942
	Jupiter E.	63 29 26	2717	61 53 9	2702	60 16 32	2696	58 39 33	2689
	Pollux E.	66 40 12	2772	65 5 8	2756	63 29 43	2741	61 53 58	2725
	Saturn E.	99 11 15	2732	97 35 17	2716	95 58 58	2699	94 22 17	2683



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17	Saturn W.	95 52 26	2705	97 28 59	2716	99 5 18	2725	100 41 25	2735
	Regulus W.	92 29 19	2736	94 5 24	2737	95 41 15	2747	97 16 53	2756
	Spica W.	38 29 26	2738	40 5 15	2747	41 40 52	2766	43 16 17	2766
	SUN E.	56 57 54	3063	55 29 24	3063	54 1 6	3105	52 33 2	3115
18	Saturn W.	108 38 47	2782	110 13 39	2780	111 48 20	2797	113 22 52	2808
	Spica W.	51 10 29	2808	52 44 46	2817	54 18 52	2825	55 52 47	2834
	Mars W.	21 16 46	3196	22 43 0	3163	24 9 29	3176	25 36 7	3170
	SUN E.	45 15 50	3165	43 48 59	3174	42 22 19	3184	40 55 51	3198
19	Spica W.	63 39 50	2872	65 12 45	2879	66 45 31	2886	68 18 8	2893
	Mars W.	32 50 19	3165	34 17 10	3167	35 43 59	3168	37 10 45	3173
	SUN E.	33 46 7	3286	32 20 41	3244	30 55 24	3253	29 30 17	3260
25	SUN W.	32 25 37	3469	33 46 36	3469	35 7 35	3469	36 28 34	3469
	α Arietis E.	58 7 51	3069	56 39 40	3100	55 11 30	3101	53 43 21	3101
	Aldebaran E.	90 24 7	3148	88 56 55	3148	87 29 43	3148	86 2 32	3148
26	SUN W.	43 13 43	3462	44 34 50	3460	45 55 59	3456	47 17 12	3454
	α Arietis E.	46 22 43	3101	44 54 35	3101	43 26 26	3100	41 58 16	3099
	Aldebaran E.	78 46 31	3145	77 19 16	3143	75 51 59	3143	74 24 41	3141
27	SUN W.	54 4 16	3432	55 25 56	3427	56 47 42	3421	58 9 35	3414
	Venus W.	25 14 30	3566	26 33 41	3556	27 53 3	3548	29 12 34	3538
	α Arietis E.	34 37 8	3092	33 8 49	3092	31 40 30	3091	30 12 10	3091
	Aldebaran E.	67 7 34	3129	65 39 59	3126	64 12 21	3123	62 44 39	3119
	Jupiter E.	106 39 20	3005	105 9 13	3000	103 39 0	2994	102 8 40	2989
28	SUN W.	65 0 58	3376	66 23 42	3368	67 46 36	3359	69 9 40	3348
	Venus W.	35 52 49	3489	37 13 25	3480	38 34 12	3468	39 55 12	3456
	Aldebaran E.	55 25 3	3100	53 56 53	3096	52 28 38	3092	51 0 19	3088
	Jupiter E.	94 35 6	2954	93 3 56	2916	91 32 36	2889	90 1 6	2890
	Pollux E.	97 22 26	3010	95 52 26	3002	94 22 16	2994	92 51 56	2985
29	SUN W.	76 8 4	3292	77 32 25	3279	78 57 1	3266	80 21 52	3253
	Venus W.	46 43 28	3393	48 5 50	3382	49 28 27	3369	50 51 20	3356
	Aldebaran E.	43 37 32	3071	42 8 47	3068	40 39 58	3067	39 11 8	3066
	Jupiter E.	82 20 36	2879	80 47 50	2867	79 14 49	2856	77 41 34	2844
	Pollux E.	85 17 15	2934	83 45 39	2923	82 13 49	2910	80 41 43	2898
30	SUN W.	87 30 15	3179	88 56 49	3163	90 23 42	3147	91 50 55	3130
	Venus W.	57 49 58	3376	59 14 37	3360	60 39 35	3344	62 4 52	3326
	α Pegasi W.	47 14 38	3133	48 42 7	3104	50 10 12	3074	51 38 53	3047
	Aldebaran E.	31 47 14	3086	30 18 47	3066	28 50 33	3116	27 22 33	3150
	Jupiter E.	69 51 12	2777	68 16 14	2763	66 40 58	2748	65 5 22	2738
	Pollux E.	72 57 12	2832	71 23 26	2816	69 49 21	2802	68 14 56	2798
	Saturn E.	105 31 45	2792	103 57 7	2777	102 22 9	2763	100 46 52	2747
31	SUN W.	99 12 14	3041	100 41 36	3022	102 11 22	3003	103 41 31	2984
	Venus W.	69 16 38	3134	70 44 6	3115	72 11 57	3096	73 40 12	3075
	α Pegasi W.	59 10 35	2918	60 42 31	2893	62 14 59	2868	63 47 59	2845
	Jupiter E.	57 2 12	2633	55 24 29	2636	53 46 23	2618	52 7 53	2601
	Pollux E.	60 17 51	2706	58 41 22	2692	57 4 31	2675	55 27 18	2658
	Saturn E.	92 45 13	2686	91 7 47	2648	89 29 57	2631	87 51 44	2613



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Sideral Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour			
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.	Semi-diameter.							
		h.	m.		s.	°			'				"		
Wed.	1	20	57	33.89	10.200	S. 17	13	42.4	42.36	16	16.06	68.33	13	48.99	0.843
Thur.	2	21	1	38.30	10.165	16	56	36.4	43.11	16	15.92	68.22	13	56.81	0.808
Fri.	3	21	5	41.86	10.130	16	39	12.8	43.84	16	15.77	68.10	14	3.80	0.273
Sat.	4	21	9	44.59	10.096	16	21	32.0	44.55	16	15.62	67.98	14	9.96	0.239
Sun.	5	21	13	46.49	10.062	16	3	34.1	45.25	16	15.46	67.87	14	15.29	0.205
Mon.	6	21	17	47.57	10.028	15	45	19.7	45.93	16	15.29	67.76	14	19.80	0.171
Tues.	7	21	21	47.84	9.994	15	26	49.3	46.58	16	15.12	67.65	14	23.50	0.138
Wed.	8	21	25	47.30	9.960	15	8	3.3	47.23	16	14.94	67.53	14	26.40	0.103
Thur.	9	21	29	45.97	9.928	14	49	1.9	47.87	16	14.76	67.41	14	28.50	0.072
Fri.	10	21	33	43.84	9.896	14	29	45.2	48.49	16	14.57	67.29	14	29.82	0.040
Sat.	11	21	37	40.95	9.864	14	10	14.1	49.08	16	14.38	67.18	14	30.37	0.008
Sun.	12	21	41	37.30	9.832	13	50	29.1	49.66	16	14.18	67.07	14	30.16	0.023
Mon.	13	21	45	32.89	9.801	13	30	30.3	50.22	16	13.98	66.96	14	29.20	0.055
Tues.	14	21	49	27.74	9.771	13	10	18.3	50.77	16	13.78	66.85	14	27.50	0.085
Wed.	15	21	53	21.87	9.741	12	49	53.2	51.30	16	13.58	66.74	14	25.09	0.115
Thur.	16	21	57	15.29	9.711	12	29	15.4	51.82	16	13.37	66.64	14	21.96	0.145
Fri.	17	22	1	7.99	9.682	12	8	25.6	52.31	16	13.16	66.54	14	18.12	0.174
Sat.	18	22	4	59.99	9.653	11	47	24.4	52.79	16	12.95	66.44	14	13.57	0.203
Sun.	19	22	8	51.31	9.625	11	26	11.9	53.24	16	12.72	66.34	14	8.35	0.231
Mon.	20	22	12	41.97	9.598	11	4	48.5	53.69	16	12.50	66.24	14	2.47	0.259
Tues.	21	22	16	31.96	9.571	10	43	14.8	54.11	16	12.28	66.14	13	55.93	0.287
Wed.	22	22	20	21.29	9.544	10	21	31.1	54.52	16	12.06	66.05	13	48.73	0.314
Thur.	23	22	24	9.98	9.517	9	59	38.0	54.90	16	11.83	65.96	13	40.88	0.340
Fri.	24	22	27	58.04	9.491	9	37	36.0	55.27	16	11.60	65.87	13	32.41	0.365
Sat.	25	22	31	45.48	9.466	9	15	25.3	55.62	16	11.37	65.78	13	23.32	0.390
Sun.	26	22	35	32.31	9.442	8	53	6.3	55.95	16	11.14	65.70	13	13.63	0.415
Mon.	27	22	39	18.56	9.418	8	30	39.7	56.27	16	10.91	65.62	13	3.36	0.439
Tues.	28	22	43	4.26	9.394	8	8	5.8	56.56	16	10.68	65.54	12	52.52	0.463
Wed.	29	22	46	49.41	9.371	7	45	24.9	56.85	16	10.44	65.47	12	41.14	0.485
Thur.	30	22	50	34.01	9.349	S. 7	22	37.3	57.12	16	10.20	65.39	12	29.22	0.507

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.13 from the Sideral Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time.			
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour.						
		h.	m.	s.		°	'	"							
Wed.	1	20	57	31.54	10.200	S. 17	13	52.2	42.36	13	48.90	0.348	20	43	42.64
Thur.	2	21	1	35.93	10.165	16	56	46.4	43.11	13	56.73	0.308	20	47	39.20
Fri.	3	21	5	39.48	10.130	16	39	23.1	43.84	14	3.73	0.273	20	51	35.75
Sat.	4	21	9	42.20	10.096	16	21	42.5	44.55	14	9.89	0.239	20	55	32.31
Sun.	5	21	13	44.09	10.062	16	3	44.8	45.25	14	15.23	0.205	20	59	28.86
Mon.	6	21	17	45.17	10.028	15	45	30.6	45.93	14	19.75	0.171	21	3	25.42
Tues.	7	21	21	45.44	9.994	15	27	0.4	46.58	14	23.46	0.138	21	7	21.98
Wed.	8	21	25	44.90	9.960	15	8	14.6	47.23	14	26.37	0.105	21	11	18.53
Thur.	9	21	29	43.57	9.928	14	49	13.4	47.87	14	28.48	0.072	21	15	15.09
Fri.	10	21	33	41.45	9.896	14	29	56.9	48.49	14	29.81	0.040	21	19	11.64
Sat.	11	21	37	38.57	9.864	14	10	26.0	49.08	14	30.37	0.008	21	23	8.20
Sun.	12	21	41	34.93	9.832	13	50	41.1	49.66	14	30.17	0.023	21	27	4.76
Mon.	13	21	45	30.53	9.801	13	30	42.4	50.22	14	29.22	0.055	21	31	1.31
Tues.	14	21	49	25.39	9.771	13	10	30.5	50.77	14	27.52	0.085	21	34	57.87
Wed.	15	21	53	19.53	9.741	12	50	5.5	51.30	14	25.11	0.115	21	38	54.42
Thur.	16	21	57	12.96	9.711	12	29	27.8	51.82	14	21.98	0.145	21	42	50.98
Fri.	17	22	1	5.68	9.682	12	8	38.1	52.31	14	18.15	0.174	21	46	47.53
Sat.	18	22	4	57.70	9.658	11	47	36.9	52.79	14	13.61	0.203	21	50	44.09
Sun.	19	22	8	49.04	9.625	11	26	24.4	53.24	14	8.40	0.231	21	54	40.64
Mon.	20	22	12	39.72	9.598	11	5	1.0	53.69	14	2.52	0.259	21	58	37.20
Tues.	21	22	16	29.73	9.571	10	43	27.3	54.11	13	55.98	0.287	22	2	33.75
Wed.	22	22	20	19.09	9.544	10	21	43.6	54.52	13	48.79	0.314	22	6	30.30
Thur.	23	22	24	7.81	9.517	9	59	50.5	54.90	13	40.95	0.340	22	10	26.86
Fri.	24	22	27	55.90	9.491	9	37	48.5	55.27	13	32.49	0.365	22	14	23.41
Sat.	25	22	31	43.37	9.466	9	15	37.6	55.62	13	23.40	0.390	22	18	19.97
Sun.	26	22	35	30.23	9.442	8	53	18.5	55.95	13	13.71	0.415	22	22	16.52
Mon.	27	22	39	16.51	9.418	8	30	51.8	56.27	13	3.44	0.439	22	26	13.07
Tues.	28	22	43	2.24	9.394	8	8	17.8	56.56	12	52.61	0.463	22	30	9.63
Wed.	29	22	46	47.42	9.371	7	45	36.8	56.85	12	41.24	0.485	22	34	6.18
Thur.	30	22	50	32.06	9.349	S. 7	22	49.1	57.12	12	29.33	0.507	22	38	2.73

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	32	311 <sup>o</sup> 55' 17.6"	54' 59.2"	152.15	+0.58	9.9936953	26.5	h. m. s. 3 15 45.20	
2	33	312 56 8.6	55 50.0	152.10	0.51	.9937599	27.4	3 11 49.29	
3	34	313 56 58.2	56 39.5	152.04	0.42	.9938268	28.3	3 7 53.88	
4	35	314 57 46.5	57 27.7	151.98	0.32	.9938960	29.2	3 3 57.47	
5	36	315 58 33.4	58 14.5	151.93	0.20	.9939675	30.2	3 0 1.56	
6	37	316 59 18.9	58 59.8	151.87	+0.07	.9940414	31.3	2 56 5.65	
7	38	317 60 3.2	59 43.9	151.82	-0.06	.9941178	32.3	2 52 9.74	
8	39	319 0 46.3	0 26.9	151.77	0.19	.9941966	33.3	2 48 13.83	
9	40	320 1 28.1	1 8.6	151.72	0.30	.9942777	34.3	2 44 17.92	
10	41	321 2 8.8	1 49.2	151.67	0.39	.9943611	35.2	2 40 22.01	
11	42	322 2 48.3	2 28.5	151.62	0.46	.9944466	36.1	2 36 26.10	
12	43	323 3 26.5	3 6.5	151.57	0.49	.9945341	36.9	2 32 30.19	
13	44	324 4 3.6	3 43.5	151.52	0.48	.9946235	37.6	2 28 34.28	
14	45	325 4 39.5	4 19.3	151.46	0.46	.9947146	38.2	2 24 38.37	
15	46	326 5 14.3	4 54.0	151.42	0.41	.9948071	38.8	2 20 42.46	
16	47	327 5 47.8	5 27.3	151.37	0.32	.9949010	39.3	2 16 46.55	
17	48	328 6 20.0	5 59.4	151.32	0.22	.9949961	39.8	2 12 50.64	
18	49	329 6 50.9	6 30.2	151.26	-0.10	.9950924	40.2	2 8 54.73	
19	50	330 7 20.4	6 59.6	151.20	+0.03	.9951898	40.6	2 4 58.83	
20	51	331 7 48.5	7 27.6	151.14	0.17	.9952880	41.0	2 1 2.92	
21	52	332 8 15.0	7 54.0	151.07	0.31	.9953870	41.3	1 57 7.01	
22	53	333 8 39.7	8 18.5	150.99	0.44	.9954867	41.6	1 53 11.10	
23	54	334 9 2.7	8 41.4	150.92	0.55	.9955872	41.9	1 49 15.19	
24	55	335 9 23.9	9 2.5	150.85	0.64	.9956885	42.2	1 45 19.29	
25	56	336 9 43.3	9 21.8	150.77	0.71	.9957906	42.6	1 41 23.38	
26	57	337 10 0.7	9 39.0	150.68	0.73	.9958935	42.9	1 37 27.47	
27	58	338 10 16.1	9 54.3	150.60	0.73	.9959972	43.3	1 33 31.56	
28	59	339 10 29.4	10 7.5	150.51	0.69	.9961018	43.7	1 29 35.65	
29	60	340 10 40.6	10 18.6	150.42	0.64	.9962075	44.1	1 25 39.75	
30	61	341 10 49.7	10 27.6	150.34	+0.56	9.9963143	44.6	1 21 43.84	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.	h. m.	m.		
1	15 35.1	15 42.8	57 5.2	+2.31	57 33.4	+2.40	7 6.4	2.32	9.5	
2	15 50.7	15 58.8	58 2.6	2.45	58 32.1	2.46	8 4.4	2.49	10.5	
3	16 6.8	16 14.4	59 1.5	2.41	59 29.9	2.31	9 5.8	2.59	11.5	
4	16 21.8	16 28.4	59 56.7	2.13	60 21.1	1.90	10 8.4	2.59	12.5	
5	16 34.2	16 39.0	60 42.4	1.62	60 59.8	1.28	11 9.7	2.49	13.5	
6	16 42.5	16 44.8	61 12.9	0.90	61 21.2	+0.47	12 8.0	2.36	14.5	
7	16 45.7	16 45.1	61 24.4	+0.05	61 22.6	-0.37	13 3.2	2.24	15.5	
8	16 43.3	16 40.1	61 15.7	-0.77	61 4.1	1.14	13 55.7	2.15	16.5	
9	16 35.8	16 30.5	60 48.3	1.47	60 28.9	1.76	14 46.6	2.11	17.5	
10	16 24.3	16 17.6	60 6.4	1.97	59 41.6	2.14	15 37.3	2.12	18.5	
11	16 10.5	16 3.1	59 15.2	2.24	58 48.0	2.29	16 28.6	2.16	19.5	
12	15 55.6	15 48.1	58 20.4	2.28	57 53.1	2.25	17 21.2	2.22	20.5	
13	15 40.9	15 34.0	57 26.5	2.17	57 1.1	2.07	18 15.1	2.26	21.5	
14	15 27.4	15 21.3	56 37.0	1.95	56 14.4	1.81	19 9.7	2.27	22.5	
15	15 15.6	15 10.4	55 53.5	1.66	55 34.4	1.51	20 3.8	2.23	23.5	
16	15 5.7	15 1.5	55 17.2	1.36	55 1.8	1.21	20 56.3	2.13	24.5	
17	14 57.8	14 54.6	54 48.2	1.06	54 36.3	0.92	21 46.1	2.01	25.5	
18	14 51.8	14 49.4	54 26.1	0.78	54 17.5	0.65	22 32.9	1.89	26.5	
19	14 47.5	14 46.0	54 10.5	0.53	54 4.9	0.41	23 16.9	1.78	27.5	
20	14 44.9	14 44.1	54 0.7	0.29	53 57.8	-0.18	23 58.5	1.70	28.5	
21	14 43.7	14 43.6	53 56.3	-0.07	53 56.0	+0.03	6		29.5	
22	14 43.8	14 44.4	53 56.9	+0.13	53 59.2	0.24	0 38.6	1.65	0.7	
23	14 45.4	14 46.8	54 2.8	0.36	54 7.8	0.48	1 18.0	1.64	1.7	
24	14 48.6	14 50.7	54 14.4	0.60	54 22.3	0.73	1 57.6	1.68	2.7	
25	14 53.3	14 56.4	54 32.0	0.87	54 43.2	1.01	2 38.5	1.75	3.7	
26	15 0.0	15 4.0	54 56.2	1.16	55 11.0	1.31	3 21.6	1.86	4.7	
27	15 8.5	15 13.6	55 27.6	1.46	55 46.1	1.61	4 8.0	2.01	5.7	
28	15 19.1	15 25.1	56 6.4	1.76	56 28.4	1.91	4 58.3	2.18	6.7	
29	15 31.5	15 38.4	56 52.2	2.04	57 17.3	2.15	5 52.6	2.34	7.7	
30	15 45.6	15 53.0	57 43.7	+2.24	58 11.0	+2.30	6 50.5	2.46	8.7	



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 1.					FRIDAY 3.				
0	h. m. s.	s.	N. 21 30 1.0	6.936	0	h. m. s.	s.	N. 27 12 8.3	0.087
1	3 34 26.08	2.46	24 36 54.6	6.929	1	5 37 27.10	2.6373	27 11 21.5	0.073
2	3 36 47.12	2.3543	24 43 40.5	6.701	2	5 40 5.44	2.6408	27 10 23.5	1.000
3	3 39 8.60	2.3617	24 50 18.7	6.971	3	5 42 43.95	2.6432	27 9 14.3	1.947
4	3 41 30.53	2.3693	24 56 49.0	6.439	4	5 45 22.63	2.6459	27 7 53.9	1.435
5	3 43 52.92	2.3769	25 3 11.4	6.306	5	5 48 1.46	2.6486	27 6 22.1	1.023
6	3 46 15.76	2.3843	25 9 25.7	6.171	6	5 50 40.45	2.6509	27 4 39.1	1.612
7	3 48 39.05	2.3918	25 15 31.9	6.035	7	5 53 19.57	2.6531	27 2 44.7	2.001
8	3 51 2.78	2.3992	25 21 29.9	5.907	8	5 55 58.83	2.6552	27 0 39.0	2.191
9	3 53 26.95	2.4066	25 27 19.6	5.768	9	5 58 38.20	2.6571	26 58 21.9	2.361
10	3 55 51.56	2.4139	25 33 0.9	5.617	10	6 1 17.68	2.6588	26 55 53.3	2.671
11	3 58 16.62	2.4212	25 38 33.8	5.475	11	6 3 57.26	2.6604	26 53 13.3	2.762
12	4 0 42.11	2.4284	25 43 58.1	5.332	12	6 6 36.93	2.6618	26 50 21.9	2.962
13	4 3 8.03	2.4356	25 49 13.7	5.187	13	6 9 16.68	2.6631	26 47 19.1	3.143
14	4 5 34.38	2.4427	25 54 20.6	5.041	14	6 11 56.50	2.6642	26 44 4.8	3.334
15	4 8 1.16	2.4498	25 59 18.7	4.894	15	6 14 36.38	2.6651	26 40 39.0	3.625
16	4 10 28.37	2.4568	26 4 7.9	4.745	16	6 17 16.31	2.6659	26 37 1.8	3.717
17	4 12 55.98	2.4638	26 8 48.1	4.594	17	6 19 56.28	2.6665	26 33 13.1	3.908
18	4 15 24.01	2.4707	26 13 19.2	4.442	18	6 22 36.29	2.6669	26 29 12.9	4.099
19	4 17 52.46	2.4775	26 17 41.2	4.289	19	6 25 16.31	2.6672	26 25 1.2	4.290
20	4 20 21.31	2.4843	26 21 53.9	4.134	20	6 27 56.35	2.6673	26 20 38.1	4.481
21	4 22 50.57	2.4909	26 25 57.3	3.978	21	6 30 36.39	2.6673	26 16 3.5	4.672
22	4 25 20.22	2.4975	26 29 51.3	3.820	22	6 33 16.43	2.6671	26 11 17.5	4.863
23	4 27 50.26	2.5040	N. 26 33 35.8	3.661	23	6 35 56.44	2.6667	N. 26 6 20.0	5.053
24	4 30 20.69	2.5104							
THURSDAY 2.					SATURDAY 4.				
0	4 32 51.51	2.5167	N. 26 37 10.8	3.501	0	6 38 30.43	2.6662	N. 26 1 11.1	5.243
1	4 35 22.70	2.5229	26 40 36.1	3.340	1	6 41 10.38	2.6655	25 55 50.8	5.433
2	4 37 54.27	2.5290	26 43 51.7	3.177	2	6 43 56.29	2.6647	25 50 19.2	6.623
3	4 40 26.20	2.5351	26 46 57.4	3.013	3	6 46 36.14	2.6637	25 44 36.2	6.812
4	4 42 58.49	2.5411	26 49 53.2	2.848	4	6 49 15.93	2.6625	25 38 41.8	6.000
5	4 45 31.13	2.5469	26 52 39.1	2.681	5	6 51 55.65	2.6612	25 32 36.1	6.188
6	4 48 4.12	2.5526	26 55 14.9	2.513	6	6 54 35.28	2.6598	25 26 19.2	6.375
7	4 50 37.45	2.5583	26 57 40.6	2.344	7	6 57 14.82	2.6582	25 19 51.0	6.562
8	4 53 11.11	2.5639	26 59 56.1	2.173	8	6 59 54.26	2.6565	25 13 11.7	6.748
9	4 55 45.10	2.5692	27 2 1.4	2.002	9	7 2 33.60	2.6546	25 6 21.2	6.934
10	4 58 19.41	2.5745	27 3 56.3	1.829	10	7 5 12.82	2.6526	24 59 19.5	7.119
11	5 0 54.03	2.5796	27 5 40.9	1.656	11	7 7 51.92	2.6505	24 52 6.8	7.303
12	5 3 28.96	2.5846	27 7 15.0	1.481	12	7 10 30.88	2.6482	24 44 43.1	7.486
13	5 6 4.18	2.5893	27 8 38.6	1.306	13	7 13 9.70	2.6456	24 37 8.4	7.669
14	5 8 39.70	2.5943	27 9 51.6	1.128	14	7 15 48.37	2.6432	24 29 22.8	7.850
15	5 11 15.50	2.5989	27 10 54.0	0.951	15	7 18 26.89	2.6406	24 21 26.4	8.031
16	5 13 51.57	2.6034	27 11 45.7	0.772	16	7 21 5.24	2.6377	24 13 19.1	8.210
17	5 16 27.90	2.6077	27 12 26.7	0.593	17	7 23 43.42	2.6348	24 5 1.1	8.389
18	5 19 4.49	2.6119	27 12 56.9	0.413	18	7 26 21.42	2.6318	23 56 32.4	8.568
19	5 21 41.32	2.6159	27 13 16.2	0.232	19	7 28 59.23	2.6286	23 47 53.1	8.743
20	5 24 18.39	2.6199	27 13 24.6	0.050	20	7 31 36.85	2.6253	23 39 3.3	8.919
21	5 26 55.71	2.6237	27 13 22.1	0.134	21	7 34 14.28	2.6220	23 30 3.0	9.093
22	5 29 33.26	2.6273	27 13 8.5	0.318	22	7 36 51.50	2.6185	23 20 52.2	9.268
23	5 32 11.00	2.6306	27 12 43.9	0.502	23	7 39 28.50	2.6149	23 11 31.1	9.437
24	5 34 48.96	2.6341	N. 27 12 8.3	0.687	24	7 42 5.29	2.6112	N. 23 1 59.8	9.607



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 5.					TUESDAY 7.				
0	7 42 5.29	2.6112	N. 23 1 59.8	9.807	0	9 42 2.23	2.3784	N. 12 35 57.9	15.740
1	7 44 41.85	2.6074	22 52 18.3	9.776	1	9 44 24.79	2.3737	12 20 11.1	15.818
2	7 47 18.18	2.6036	22 42 26.7	9.944	2	9 46 47.07	2.3690	12 4 19.7	15.894
3	7 49 54.28	2.6000	22 32 25.1	10.110	3	9 49 9.06	2.3642	11 48 23.8	15.968
4	7 52 30.13	2.5965	22 22 13.5	10.275	4	9 51 30.77	2.3595	11 32 23.5	16.040
5	7 55 5.74	2.5934	22 11 52.1	10.438	5	9 53 52.21	2.3549	11 16 19.0	16.109
6	7 57 41.10	2.5873	22 1 20.9	10.600	6	9 56 13.37	2.3503	11 0 10.5	16.176
7	8 0 16.21	2.5829	21 50 40.0	10.761	7	9 58 34.25	2.3458	10 43 58.0	16.241
8	8 2 51.05	2.5784	21 39 49.6	10.920	8	10 0 54.87	2.3414	10 27 41.6	16.308
9	8 5 25.62	2.5740	21 28 49.7	11.077	9	10 3 15.22	2.3369	10 11 21.6	16.368
10	8 7 59.93	2.5696	21 17 40.4	11.233	10	10 5 35.30	2.3326	9 54 58.0	16.421
11	8 10 33.96	2.5649	21 6 21.8	11.387	11	10 7 55.13	2.3283	9 38 31.0	16.478
12	8 13 7.72	2.5602	20 54 54.0	11.539	12	10 10 14.70	2.3240	9 22 0.6	16.532
13	8 15 41.19	2.5556	20 43 17.1	11.689	13	10 12 34.01	2.3198	9 5 27.1	16.584
14	8 18 14.38	2.5509	20 31 31.3	11.837	14	10 14 53.08	2.3157	8 48 50.5	16.634
15	8 20 47.29	2.5460	20 19 36.5	11.984	15	10 17 11.90	2.3117	8 32 11.0	16.681
16	8 23 19.90	2.5411	20 7 33.0	12.130	16	10 19 30.48	2.3077	8 15 28.8	16.727
17	8 25 52.22	2.5363	19 55 20.8	12.275	17	10 21 48.82	2.3037	7 58 43.9	16.770
18	8 28 24.24	2.5312	19 43 0.0	12.417	18	10 24 6.92	2.2998	7 41 56.4	16.811
19	8 30 55.97	2.5262	19 30 30.8	12.557	19	10 26 24.78	2.2960	7 25 6.5	16.850
20	8 33 27.39	2.5212	19 17 53.2	12.695	20	10 28 42.44	2.2923	7 8 14.4	16.887
21	8 35 58.51	2.5163	19 5 7.4	12.831	21	10 30 59.86	2.2886	6 51 20.1	16.921
22	8 38 29.33	2.5111	18 52 13.5	12.965	22	10 33 17.07	2.2850	6 34 23.8	16.953
23	8 40 59.84	2.5060	N. 18 39 11.6	13.097	23	10 35 34.06	2.2814	N. 6 17 25.6	16.984
MONDAY 6.					WEDNESDAY 8.				
0	8 43 30.05	2.5009	N. 18 26 1.8	13.227	0	10 37 50.84	2.2780	N. 6 0 25.7	17.012
1	8 45 59.95	2.4967	18 12 44.2	13.356	1	10 40 7.42	2.2746	5 43 24.1	17.039
2	8 48 29.54	2.4906	17 59 19.0	13.483	2	10 42 23.79	2.2712	5 26 21.0	17.063
3	8 50 58.82	2.4844	17 45 46.2	13.607	3	10 44 39.96	2.2679	5 9 16.5	17.086
4	8 53 27.79	2.4802	17 32 6.1	13.730	4	10 46 55.94	2.2648	4 52 10.7	17.108
5	8 55 56.45	2.4760	17 18 18.6	13.851	5	10 49 11.73	2.2617	4 35 3.8	17.124
6	8 58 24.79	2.4698	17 4 24.0	13.970	6	10 51 27.34	2.2587	4 17 55.8	17.140
7	9 0 52.82	2.4646	16 50 22.3	14.085	7	10 53 42.77	2.2557	4 0 46.9	17.154
8	9 3 20.54	2.4594	16 36 13.7	14.200	8	10 55 58.02	2.2528	3 43 37.3	17.168
9	9 5 47.95	2.4542	16 21 58.3	14.312	9	10 58 13.10	2.2499	3 26 27.0	17.176
10	9 8 15.05	2.4491	16 7 36.2	14.422	10	11 0 28.01	2.2472	3 9 16.1	17.184
11	9 10 41.84	2.4438	15 53 7.6	14.530	11	11 2 42.76	2.2446	2 52 4.9	17.190
12	9 13 8.31	2.4386	15 38 32.6	14.636	12	11 4 57.36	2.2420	2 34 53.3	17.194
13	9 15 34.47	2.4335	15 23 51.2	14.741	13	11 7 11.80	2.2395	2 17 41.5	17.197
14	9 18 0.33	2.4284	15 9 3.7	14.843	14	11 9 26.10	2.2371	2 0 29.7	17.197
15	9 20 25.89	2.4232	14 54 10.2	14.942	15	11 11 40.25	2.2347	1 43 17.9	17.195
16	9 22 51.12	2.4180	14 39 10.7	15.039	16	11 13 54.26	2.2324	1 26 6.3	17.191
17	9 25 16.06	2.4131	14 24 5.5	15.134	17	11 16 8.14	2.2302	1 8 55.0	17.185
18	9 27 40.69	2.4080	14 8 54.6	15.228	18	11 18 21.89	2.2281	0 51 44.1	17.177
19	9 30 5.02	2.4031	13 53 38.2	15.318	19	11 20 35.51	2.2261	0 34 33.7	17.168
20	9 32 29.06	2.3981	13 38 16.4	15.407	20	11 22 49.01	2.2241	0 17 23.9	17.156
21	9 34 52.79	2.3931	13 22 49.3	15.493	21	11 25 2.40	2.2221	N. 0 0 14.9	17.143
22	9 37 16.23	2.3882	13 7 17.2	15.578	22	11 27 15.67	2.2203	S. 0 16 53.2	17.127
23	9 39 39.38	2.3833	12 51 39.9	15.660	23	11 29 28.84	2.2186	0 34 0.4	17.111
24	9 42 2.23	2.3784	N. 12 35 57.9	15.740	24	11 31 41.91	2.2170	S. 0 51 6.5	17.091



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 9.					SATURDAY 11.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	11 31 41.91	2.3170	S. 0 51 6.5	17.091	0	13 17 35.65	2.2208	S. 13 37 44.1	14.366
1	11 33 54.88	2.3154	1 8 11.4	17.071	1	13 19 48.95	2.2234	13 51 57.3	14.173
2	11 36 7.76	2.3189	1 25 15.0	17.048	2	13 22 2.34	2.2239	14 6 4.9	14.098
3	11 38 20.55	2.3134	1 42 17.2	17.024	3	13 24 15.82	2.2255	14 20 6.7	13.983
4	11 40 33.25	2.3111	1 59 17.9	16.991	4	13 26 29.39	2.2272	14 34 2.8	13.885
5	11 42 45.88	2.3099	2 16 17.0	16.970	5	13 28 43.08	2.2280	14 47 53.0	13.787
6	11 44 58.43	2.3087	2 33 14.3	16.939	6	13 30 56.88	2.2307	15 1 37.3	13.687
7	11 47 10.91	2.3075	2 50 9.8	16.908	7	13 33 10.78	2.2325	15 15 15.6	13.587
8	11 49 23.34	2.3065	3 7 3.3	16.874	8	13 35 24.78	2.2343	15 28 47.8	13.485
9	11 51 35.69	2.3066	3 23 54.8	16.840	9	13 37 38.90	2.2362	15 42 13.8	13.383
10	11 53 47.99	2.3048	3 40 44.1	16.803	10	13 39 53.13	2.2382	15 55 33.7	13.279
11	11 56 0.24	2.3038	3 57 31.2	16.765	11	13 42 7.48	2.2401	16 8 47.3	13.174
12	11 58 12.45	2.3031	4 14 15.9	16.724	12	13 44 21.94	2.2420	16 21 54.6	13.068
13	12 0 24.61	2.3024	4 30 58.2	16.683	13	13 46 36.52	2.2440	16 34 55.5	12.961
14	12 2 36.74	2.3018	4 47 37.9	16.639	14	13 48 51.22	2.2460	16 47 49.9	12.853
15	12 4 48.83	2.3012	5 4 14.9	16.594	15	13 51 6.04	2.2480	17 0 37.8	12.744
16	12 7 0.89	2.3006	5 20 49.2	16.547	16	13 53 20.98	2.2501	17 13 19.1	12.634
17	12 9 12.93	2.3004	5 37 20.6	16.499	17	13 55 36.05	2.2522	17 25 53.8	12.522
18	12 11 24.94	2.3001	5 53 49.1	16.449	18	13 57 51.24	2.2543	17 38 21.7	12.409
19	12 13 36.94	2.2999	6 10 14.6	16.398	19	14 0 6.56	2.2564	17 50 42.9	12.296
20	12 15 48.93	2.2998	6 26 36.9	16.345	20	14 2 22.01	2.2586	18 2 57.2	12.181
21	12 18 0.91	2.2997	6 42 56.0	16.291	21	14 4 37.59	2.2608	18 15 4.6	12.066
22	12 20 12.89	2.2997	6 59 11.8	16.234	22	14 6 53.30	2.2629	18 27 5.1	11.950
23	12 22 24.87	2.2997	S. 7 15 24.2	16.177	23	14 9 9.14	2.2651	S. 18 38 58.6	11.833
FRIDAY 10.					SUNDAY 12.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	12 24 36.85	2.2998	S. 7 31 33.0	16.117	0	14 11 25.11	2.2673	S. 18 50 45.0	11.714
1	12 26 48.84	2.2999	7 47 38.2	16.067	1	14 13 41.21	2.2695	19 2 24.3	11.595
2	12 29 0.84	2.3002	8 3 30.7	15.994	2	14 15 57.45	2.2717	19 13 56.4	11.474
3	12 31 12.86	2.3005	8 19 37.5	15.930	3	14 18 13.82	2.2739	19 25 21.2	11.353
4	12 33 24.90	2.3009	8 35 31.3	15.863	4	14 20 30.32	2.2762	19 36 38.8	11.231
5	12 35 36.97	2.3013	8 51 21.2	15.797	5	14 22 46.96	2.2784	19 47 49.0	11.108
6	12 37 49.06	2.3018	9 7 7.0	15.729	6	14 25 3.74	2.2807	19 58 51.8	10.985
7	12 40 1.18	2.3024	9 22 48.7	15.660	7	14 27 20.64	2.2829	20 9 47.2	10.861
8	12 42 13.34	2.3030	9 38 26.2	15.589	8	14 29 37.68	2.2852	20 20 35.1	10.735
9	12 44 25.54	2.3036	9 53 59.4	15.517	9	14 31 54.86	2.2874	20 31 15.5	10.609
10	12 46 37.78	2.3044	10 9 28.2	15.443	10	14 34 12.17	2.2896	20 41 48.2	10.481
11	12 48 50.07	2.3052	10 24 52.5	15.368	11	14 36 29.61	2.2918	20 52 13.3	10.353
12	12 51 2.41	2.3061	10 40 12.3	15.291	12	14 38 47.19	2.2941	21 2 30.6	10.224
13	12 53 14.80	2.3070	10 55 27.4	15.213	13	14 41 4.90	2.2963	21 12 40.2	10.095
14	12 55 27.25	2.3080	11 10 37.8	15.133	14	14 43 22.75	2.2985	21 23 42.0	9.965
15	12 57 39.76	2.3091	11 25 43.3	15.052	15	14 45 40.72	2.3008	21 32 36.0	9.834
16	12 59 52.34	2.3102	11 40 44.0	14.970	16	14 47 58.82	2.3032	21 42 22.1	9.702
17	13 2 4.99	2.3113	11 55 39.7	14.887	17	14 50 17.06	2.3055	21 52 0.3	9.570
18	13 4 17.70	2.3125	12 10 30.4	14.802	18	14 52 35.42	2.3077	22 1 30.5	9.437
19	13 6 30.49	2.3138	12 25 15.9	14.716	19	14 54 53.91	2.3099	22 10 52.7	9.303
20	13 8 43.35	2.3151	12 39 56.3	14.628	20	14 57 12.53	2.3118	22 20 8.8	9.168
21	13 10 56.30	2.3165	12 54 31.4	14.540	21	14 59 31.27	2.3133	22 29 12.9	9.033
22	13 13 9.33	2.3179	13 9 1.1	14.450	22	15 1 50.13	2.3153	22 38 10.8	8.897
23	13 15 22.45	2.3193	13 23 25.3	14.359	23	15 4 9.11	2.3174	22 47 0.5	8.761
24	13 17 35.65	2.3208	S. 13 37 44.1	14.266	24	15 6 28.22	2.3194	S. 22 55 42.0	8.624



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 13.					WEDNESDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	15 6 28.92	2.3194	S.22 55 42.0	8.634	1	16 59 9.94	2.3513	S.27 3 41.5	1.622
2	15 8 47.44	2.3213	23 4 15.3	8.487	2	17 1 30.98	2.3501	27 5 14.3	1.473
3	15 11 6.77	2.3222	23 12 40.4	8.349	3	17 3 51.96	2.3490	27 6 38.2	1.325
4	15 13 26.23	2.3251	23 20 57.2	8.210	4	17 6 12.86	2.3478	27 7 53.3	1.177
5	15 15 45.81	2.3270	23 29 5.6	8.071	5	17 8 33.69	2.3464	27 8 59.5	1.030
6	15 18 5.49	2.3289	23 37 5.7	7.931	6	17 10 54.43	2.3450	27 9 56.9	0.883
7	15 20 25.27	2.3307	23 44 57.3	7.791	7	17 13 15.09	2.3435	27 10 45.5	0.737
8	15 22 45.16	2.3324	23 52 40.5	7.650	8	17 15 35.65	2.3418	27 11 25.3	0.590
9	15 25 5.16	2.3341	24 0 15.3	7.509	9	17 17 56.11	2.3401	27 11 56.3	0.444
10	15 27 25.26	2.3357	24 7 41.6	7.367	10	17 20 16.46	2.3383	27 12 18.5	0.298
11	15 29 45.45	2.3373	24 14 59.4	7.225	11	17 22 36.71	2.3366	27 12 32.0	0.153
12	15 32 5.73	2.3389	24 22 8.6	7.082	12	17 24 56.85	2.3347	27 12 36.8	0.008
13	15 34 26.11	2.3404	24 29 9.2	6.939	13	17 27 16.87	2.3326	27 12 32.9	0.137
14	15 36 46.58	2.3418	24 36 1.2	6.795	14	17 29 36.76	2.3304	27 12 20.3	0.282
15	15 39 7.13	2.3432	24 42 44.5	6.651	15	17 31 56.52	2.3282	27 11 59.1	0.426
16	15 41 27.76	2.3445	24 49 19.2	6.506	16	17 34 16.15	2.3261	27 11 29.2	0.570
17	15 43 48.47	2.3458	24 55 45.2	6.361	17	17 36 35.65	2.3237	27 10 50.7	0.713
18	15 46 9.26	2.3471	25 2 2.4	6.215	18	17 38 55.00	2.3213	27 10 3.6	0.856
19	15 48 30.13	2.3483	25 8 10.9	6.069	19	17 41 14.21	2.3189	27 9 8.0	0.998
20	15 50 51.06	2.3494	25 14 10.6	5.923	20	17 43 33.27	2.3168	27 8 3.9	1.139
21	15 53 12.06	2.3505	25 20 1.6	5.776	21	17 45 52.16	2.3136	27 6 51.3	1.280
22	15 55 33.12	2.3515	25 25 43.8	5.629	22	17 48 10.90	2.3110	27 5 30.2	1.422
23	15 57 54.24	2.3524	25 31 17.1	5.482	23	17 50 29.48	2.3083	27 4 0.7	1.562
24	16 0 15.41	2.3533	S.25 36 41.6	5.335	24	17 52 47.89	2.3054	S.27 2 22.7	1.703
TUESDAY 14.					THURSDAY 16.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	16 2 36.64	2.3541	S.25 41 57.3	5.186	1	17 55 6.12	2.3024	S.27 0 36.4	1.842
2	16 4 57.90	2.3549	25 47 4.1	5.040	2	17 57 24.18	2.2994	26 58 41.7	1.981
3	16 7 19.21	2.3555	25 52 2.1	4.892	3	17 59 42.05	2.2963	26 56 38.8	2.118
4	16 9 40.56	2.3561	25 56 51.1	4.744	4	18 1 59.74	2.2932	26 54 27.6	2.256
5	16 12 1.94	2.3567	26 1 31.3	4.596	5	18 4 17.23	2.2900	26 52 8.1	2.392
6	16 14 23.36	2.3571	26 6 2.6	4.448	6	18 6 34.53	2.2867	26 49 40.5	2.529
7	16 16 44.80	2.3575	26 10 25.0	4.300	7	18 8 51.64	2.2834	26 47 4.7	2.664
8	16 19 6.26	2.3578	26 14 38.5	4.151	8	18 11 8.54	2.2800	26 44 20.7	2.800
9	16 21 27.74	2.3581	26 18 43.1	4.002	9	18 13 25.24	2.2765	26 41 28.7	2.934
10	16 23 49.23	2.3583	26 22 38.8	3.853	10	18 15 41.73	2.2730	26 38 28.6	3.068
11	16 26 10.73	2.3585	26 26 25.5	3.704	11	18 17 58.00	2.2694	26 35 20.5	3.200
12	16 28 32.24	2.3588	26 30 3.3	3.555	12	18 20 14.06	2.2657	26 32 4.5	3.333
13	16 30 53.75	2.3589	26 33 32.1	3.406	13	18 22 29.89	2.2620	26 28 40.6	3.464
14	16 33 15.24	2.3591	26 36 52.0	3.257	14	18 24 45.50	2.2583	26 25 8.8	3.596
15	16 35 36.72	2.3579	26 40 3.0	3.109	15	18 27 0.89	2.2545	26 21 29.1	3.726
16	16 37 58.19	2.3576	26 43 5.0	2.959	16	18 29 16.05	2.2507	26 17 41.6	3.856
17	16 40 19.64	2.3572	26 45 58.1	2.811	17	18 31 30.97	2.2467	26 13 46.4	3.984
18	16 42 41.07	2.3568	26 48 42.3	2.662	18	18 33 45.65	2.2427	26 9 43.5	4.113
19	16 45 2.46	2.3563	26 51 17.5	2.513	19	18 36 0.09	2.2387	26 5 33.0	4.240
20	16 47 23.82	2.3567	26 53 43.8	2.364	20	18 38 14.30	2.2347	26 1 14.8	4.367
21	16 49 45.14	2.3549	26 56 1.1	2.216	21	18 40 28.26	2.2306	25 56 49.1	4.492
22	16 52 6.41	2.3542	26 58 9.6	2.067	22	18 42 41.97	2.2264	25 52 15.8	4.617
23	16 54 27.64	2.3534	27 0 9.1	1.919	23	18 44 55.42	2.2223	25 47 35.1	4.740
24	16 56 48.82	2.3525	27 1 59.8	1.770	24	18 47 8.63	2.2180	25 42 46.9	4.864
	16 59 9.94	2.3513	S.27 3 41.5	1.622		18 49 21.58	2.2137	S.25 37 51.4	4.986



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 17.					SUNDAY 19.				
0	h. m. s.	s.	S. ° ' "	"	0	h. m. s.	s.	S. ° ' "	"
1	18 49 21.58	2.2137	S. 25 37 51.4	4.988	1	20 30 15.71	1.9898	S. 19 33 42.9	9.837
2	18 51 34.97	2.2093	25 32 48.5	5.108	2	20 32 14.91	1.9843	19 23 50.3	9.916
3	18 53 46.70	2.2050	25 27 38.4	5.229	3	20 34 13.83	1.9798	19 13 52.9	9.993
4	18 55 58.87	2.2006	25 22 21.0	5.350	4	20 36 12.49	1.9754	19 3 50.9	10.071
5	18 58 10.77	2.1962	25 16 56.4	5.469	5	20 38 10.88	1.9710	18 53 44.4	10.146
6	19 0 22.40	2.1917	25 11 24.6	5.588	6	20 40 9.00	1.9665	18 43 33.3	10.222
7	19 2 33.77	2.1873	25 5 45.8	5.708	7	20 42 6.86	1.9622	18 33 17.8	10.296
8	19 4 44.87	2.1827	24 59 59.9	5.823	8	20 44 4.46	1.9578	18 22 57.9	10.369
9	19 6 55.69	2.1781	24 54 7.1	5.938	9	20 46 1.79	1.9534	18 12 33.6	10.441
10	19 9 6.24	2.1736	24 48 7.3	6.054	10	20 47 58.87	1.9492	18 2 5.0	10.512
11	19 11 16.52	2.1689	24 42 0.7	6.167	11	20 49 55.69	1.9448	17 51 32.1	10.582
12	19 13 26.51	2.1642	24 35 47.2	6.281	12	20 51 52.26	1.9407	17 40 55.0	10.632
13	19 15 36.23	2.1597	24 29 26.9	6.398	13	20 53 48.57	1.9364	17 30 13.9	10.721
14	19 17 45.67	2.1549	24 22 59.9	6.506	14	20 55 44.63	1.9322	17 19 28.6	10.789
15	19 19 54.82	2.1502	24 16 26.3	6.615	15	20 57 40.45	1.9282	17 8 39.2	10.856
16	19 22 3.69	2.1455	24 9 46.0	6.726	16	20 59 36.02	1.9241	16 57 45.9	10.922
17	19 24 12.28	2.1408	24 2 59.2	6.834	17	21 1 31.34	1.9201	16 46 48.6	10.986
18	19 26 20.59	2.1361	23 56 5.9	6.943	18	21 3 26.43	1.9160	16 35 47.5	11.061
19	19 28 28.61	2.1313	23 49 6.1	7.050	19	21 5 21.27	1.9120	16 24 42.5	11.118
20	19 30 36.35	2.1265	23 41 59.9	7.157	20	21 7 15.87	1.9082	16 13 33.8	11.176
21	19 32 43.80	2.1217	23 34 47.4	7.262	21	21 9 10.24	1.9043	16 2 21.4	11.237
22	19 34 50.96	2.1170	23 27 28.6	7.367	22	21 11 4.36	1.9004	15 51 5.3	11.298
23	19 36 57.83	2.1122	23 20 3.5	7.470	23	21 12 58.29	1.8966	15 39 45.5	11.357
24	19 39 4.42	2.1074	S. 23 12 32.2	7.573	24	21 14 51.97	1.8928	S. 15 28 22.2	11.417
SATURDAY 18.					MONDAY 20.				
0	19 41 10.72	2.1026	S. 23 4 54.8	7.674	0	21 16 45.43	1.8891	S. 15 16 55.4	11.475
1	19 43 16.73	2.0978	22 57 11.4	7.775	1	21 18 38.66	1.8854	15 5 25.2	11.533
2	19 45 22.46	2.0930	22 49 21.9	7.874	2	21 20 31.68	1.8818	14 53 51.5	11.589
3	19 47 27.90	2.0882	22 41 26.5	7.973	3	21 22 24.48	1.8782	14 42 14.5	11.645
4	19 49 33.04	2.0833	22 33 25.1	8.070	4	21 24 17.07	1.8747	14 30 34.1	11.699
5	19 51 37.88	2.0784	22 25 17.9	8.168	5	21 26 9.44	1.8712	14 18 50.5	11.753
6	19 53 42.44	2.0736	22 17 4.9	8.264	6	21 28 1.60	1.8677	14 7 3.8	11.805
7	19 55 46.71	2.0688	22 8 46.1	8.360	7	21 29 53.56	1.8643	13 55 13.9	11.856
8	19 57 50.69	2.0639	22 0 21.7	8.454	8	21 31 45.32	1.8609	13 43 20.9	11.906
9	19 59 54.38	2.0592	21 51 51.6	8.548	9	21 33 36.87	1.8576	13 31 24.9	11.959
10	20 1 57.79	2.0544	21 43 16.0	8.640	10	21 35 28.23	1.8544	13 19 25.8	12.008
11	20 4 0.91	2.0496	21 34 34.8	8.732	11	21 37 19.40	1.8512	13 7 23.8	12.057
12	20 6 3.74	2.0448	21 25 48.2	8.822	12	21 39 10.37	1.8480	12 55 18.9	12.105
13	20 8 6.29	2.0401	21 16 56.2	8.913	13	21 41 1.16	1.8449	12 43 11.1	12.153
14	20 10 8.55	2.0353	21 7 58.8	9.000	14	21 42 51.76	1.8417	12 31 0.5	12.199
15	20 12 10.53	2.0306	20 58 56.1	9.088	15	21 44 42.17	1.8387	12 18 47.2	12.245
16	20 14 12.22	2.0259	20 49 48.2	9.174	16	21 46 32.41	1.8356	12 6 31.1	12.289
17	20 16 13.64	2.0212	20 40 35.1	9.261	17	21 48 22.47	1.8326	11 54 12.4	12.333
18	20 18 14.77	2.0165	20 31 16.9	9.345	18	21 50 12.36	1.8290	11 41 51.1	12.375
19	20 20 15.63	2.0119	20 21 53.6	9.430	19	21 52 2.08	1.8271	11 29 27.3	12.418
20	20 22 16.19	2.0073	20 12 25.3	9.513	20	21 53 51.63	1.8248	11 17 0.9	12.459
21	20 24 16.48	2.0026	20 2 52.0	9.596	21	21 55 41.00	1.8217	11 4 32.1	12.500
22	20 26 16.50	1.9980	19 53 13.8	9.677	22	21 57 30.24	1.8189	10 52 0.8	12.540
23	20 28 16.24	1.9934	19 43 30.7	9.758	23	21 59 19.31	1.8165	10 39 27.2	12.579
24	20 30 15.71	1.9889	S. 19 33 42.9	9.837	24	22 1 8.22	1.8139	S. 10 26 51.3	12.617



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 21.					THURSDAY 23.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	22 1 8.92	1.8139	S. 10 26 51.3	12.617	0	23 26 21.44	1.7697	N. 0 8 5.4	12.580
1	22 2 56.98	1.8114	10 14 13.2	12.656	1	23 28 7.03	1.7691	0 21 38.5	12.582
2	22 4 45.60	1.8089	10 1 33.8	12.691	2	23 29 52.65	1.7698	0 35 11.6	12.582
3	22 6 34.07	1.8068	9 48 50.2	12.728	3	23 31 38.29	1.7610	0 48 44.7	12.583
4	22 8 22.40	1.8043	9 36 5.5	12.762	4	23 33 23.96	1.7616	1 9 17.8	12.580
5	22 10 10.59	1.8021	9 23 18.7	12.797	5	23 35 9.67	1.7621	1 15 50.8	12.548
6	22 11 58.65	1.7999	9 10 29.9	12.830	6	23 36 55.41	1.7636	1 29 23.6	12.545
7	22 13 46.57	1.7977	8 57 39.1	12.868	7	23 38 41.20	1.7636	1 42 56.2	12.543
8	22 15 34.37	1.7956	8 44 46.4	12.894	8	23 40 27.04	1.7648	1 56 28.6	12.538
9	22 17 22.05	1.7935	8 31 51.8	12.926	9	23 42 12.92	1.7662	2 10 0.8	12.534
10	22 19 9.60	1.7915	8 18 55.3	12.956	10	23 43 58.86	1.7682	2 23 32.7	12.528
11	22 20 57.03	1.7896	8 5 57.0	12.986	11	23 45 44.86	1.7672	2 37 4.1	12.522
12	22 22 44.35	1.7877	7 52 57.0	12.012	12	23 47 30.92	1.7682	2 50 35.2	12.516
13	22 24 31.56	1.7858	7 39 55.3	12.042	13	23 49 17.05	1.7693	3 4 5.9	12.508
14	22 26 18.66	1.7840	7 26 52.0	12.069	14	23 51 3.24	1.7708	3 17 36.2	12.499
15	22 28 5.66	1.7823	7 13 47.0	12.098	15	23 52 49.51	1.7717	3 31 5.9	12.490
16	22 29 52.55	1.7807	7 0 40.5	12.129	16	23 54 35.85	1.7730	3 44 35.0	12.480
17	22 31 39.35	1.7792	6 47 32.4	12.147	17	23 56 22.27	1.7744	3 58 3.5	12.470
18	22 33 26.06	1.7777	6 34 22.9	12.170	18	23 58 8.78	1.7760	4 11 31.4	12.459
19	22 35 12.67	1.7762	6 21 11.9	12.194	19	23 59 55.38	1.7774	4 24 58.6	12.447
20	22 36 59.20	1.7748	6 7 59.6	12.216	20	0 1 42.07	1.7789	4 38 25.0	12.434
21	22 38 45.64	1.7734	5 54 45.9	12.239	21	0 3 28.85	1.7806	4 51 50.6	12.420
22	22 40 32.01	1.7721	5 41 30.9	12.260	22	0 5 15.74	1.7823	5 5 15.4	12.406
23	22 42 18.30	1.7708	S. 5 28 14.7	12.281	23	0 7 2.73	1.7841	N. 5 18 39.3	12.391
WEDNESDAY 22.					FRIDAY 24.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	22 44 4.52	1.7697	S. 5 14 57.2	12.300	0	0 8 49.83	1.7869	N. 5 32 2.3	12.375
1	22 45 50.67	1.7686	5 1 38.6	12.319	1	0 10 37.04	1.7878	5 45 24.3	12.368
2	22 47 36.75	1.7676	4 48 18.9	12.337	2	0 12 24.37	1.7898	5 58 45.3	12.341
3	22 49 22.77	1.7666	4 34 58.1	12.356	3	0 14 11.81	1.7918	6 12 5.2	12.328
4	22 51 8.74	1.7657	4 21 36.3	12.371	4	0 15 59.38	1.7939	6 25 24.0	12.304
5	22 52 54.65	1.7647	4 8 13.5	12.387	5	0 17 47.08	1.7961	6 38 41.7	12.264
6	22 54 40.50	1.7639	3 54 49.8	12.402	6	0 19 34.91	1.7988	6 51 58.1	12.263
7	22 56 26.31	1.7632	3 41 25.2	12.417	7	0 21 22.86	1.8006	7 5 13.3	12.242
8	22 58 12.08	1.7625	3 27 59.8	12.430	8	0 23 10.98	1.8029	7 18 27.2	12.220
9	22 59 57.81	1.7618	3 14 33.6	12.443	9	0 24 59.22	1.8068	7 31 39.7	12.197
10	23 1 43.50	1.7612	3 1 6.6	12.456	10	0 26 47.62	1.8078	7 44 50.8	12.173
11	23 3 29.16	1.7607	2 47 38.9	12.467	11	0 28 36.17	1.8104	7 58 0.5	12.149
12	23 5 14.79	1.7603	2 34 10.6	12.477	12	0 30 24.87	1.8130	8 11 8.7	12.123
13	23 7 0.40	1.7599	2 20 41.6	12.488	13	0 32 13.73	1.8167	8 24 15.3	12.097
14	23 8 45.98	1.7596	2 7 12.1	12.497	14	0 34 2.75	1.8194	8 37 20.3	12.070
15	23 10 31.54	1.7592	1 53 42.0	12.506	15	0 35 51.94	1.8212	8 50 23.7	12.043
16	23 12 17.09	1.7591	1 40 11.5	12.513	16	0 37 41.30	1.8242	9 3 25.4	12.014
17	23 14 2.63	1.7590	1 26 40.5	12.520	17	0 39 30.84	1.8271	9 16 25.4	12.985
18	23 15 48.17	1.7589	1 13 9.1	12.526	18	0 41 20.55	1.8301	9 29 23.6	12.964
19	23 17 33.70	1.7588	0 59 37.3	12.532	19	0 43 10.45	1.8333	9 42 19.9	12.923
20	23 19 19.23	1.7589	0 46 5.2	12.537	20	0 45 0.53	1.8368	9 55 14.4	12.901
21	23 21 4.77	1.7590	0 32 32.9	12.541	21	0 46 50.80	1.8396	10 8 6.9	12.876
22	23 22 50.31	1.7592	0 19 0.3	12.546	22	0 48 41.27	1.8427	10 20 57.5	12.825
23	23 24 35.87	1.7594	S. 0 5 27.5	12.548	23	0 50 31.93	1.8461	10 33 46.0	12.791
24	23 26 21.44	1.7597	N. 0 8 5.4	12.550	24	0 52 22.80	1.8495	N. 10 46 32.4	12.755



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 25.					MONDAY 27.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	0 52 22.80	1.8496	N.10 46 32.4	12.785	0	2 26 14.05	2.0927	N.20 0 46.3	9.266
1	0 54 13.87	1.8529	10 59 16.7	12.719	1	2 28 19.19	2.0987	20 10 41.2	9.872
2	0 56 5.14	1.8564	11 11 58.7	12.682	2	2 30 24.70	2.0948	20 20 31.0	9.787
3	0 57 56.64	1.8601	11 24 38.5	12.644	3	2 32 30.58	2.1010	20 30 15.7	9.701
4	0 59 48.35	1.8637	11 37 16.0	12.605	4	2 34 36.83	2.1073	20 30 55.1	9.613
5	1 1 40.28	1.8674	11 49 51.2	12.566	5	2 36 43.45	2.1135	20 49 29.3	9.525
6	1 3 32.44	1.8712	12 2 23.9	12.525	6	2 38 50.45	2.1198	20 58 58.1	9.435
7	1 5 24.83	1.8751	12 14 54.2	12.484	7	2 40 57.83	2.1261	21 8 21.5	9.344
8	1 7 17.45	1.8790	12 27 22.0	12.441	8	2 43 5.58	2.1324	21 17 39.4	9.252
9	1 9 10.31	1.8830	12 39 47.2	12.398	9	2 45 13.71	2.1388	21 26 51.8	9.159
10	1 11 3.41	1.8870	12 52 9.8	12.354	10	2 47 22.23	2.1452	21 35 58.6	9.065
11	1 12 56.75	1.8911	13 4 29.8	12.310	11	2 49 31.13	2.1516	21 44 59.6	8.969
12	1 14 50.34	1.8952	13 16 47.0	12.264	12	2 51 40.42	2.1580	21 53 54.9	8.872
13	1 16 44.18	1.8994	13 29 1.5	12.217	13	2 53 50.09	2.1644	22 2 44.3	8.775
14	1 18 38.27	1.9037	13 41 13.1	12.169	14	2 56 0.15	2.1709	22 11 27.8	8.675
15	1 20 32.62	1.9081	13 53 21.8	12.121	15	2 58 10.60	2.1774	22 20 5.3	8.575
16	1 22 27.24	1.9125	14 5 27.6	12.073	16	3 0 21.44	2.1839	22 28 36.8	8.473
17	1 24 22.12	1.9169	14 17 30.4	12.022	17	3 2 32.67	2.1904	22 37 2.1	8.370
18	1 26 17.27	1.9214	14 29 30.2	11.970	18	3 4 44.29	2.1969	22 45 21.2	8.265
19	1 28 12.70	1.9251	14 41 26.9	11.918	19	3 6 56.30	2.2035	22 53 33.9	8.160
20	1 30 8.40	1.9307	14 53 20.4	11.864	20	3 9 8.71	2.2100	23 1 40.3	8.053
21	1 32 4.39	1.9354	15 5 10.6	11.810	21	3 11 21.50	2.2165	23 9 40.3	7.945
22	1 34 0.65	1.9401	15 16 57.6	11.754	22	3 13 34.69	2.2231	23 17 33.7	7.836
23	1 35 57.20	1.9449	N.15 28 41.2	11.698	23	3 15 48.28	2.2297	N.23 25 20.6	7.725
SUNDAY 26.					TUESDAY 28.				
0	1 37 54.05	1.9499	N.15 40 21.5	11.641	0	3 18 2.26	2.2362	N.23 33 0.8	7.613
1	1 39 51.19	1.9548	15 51 58.3	11.583	1	3 20 16.63	2.2428	23 40 34.3	7.500
2	1 41 48.63	1.9598	16 3 31.5	11.524	2	3 22 31.40	2.2494	23 48 0.9	7.386
3	1 43 46.37	1.9649	16 15 1.2	11.464	3	3 24 46.56	2.2560	23 55 20.6	7.271
4	1 45 44.41	1.9700	16 26 27.2	11.403	4	3 27 2.12	2.2626	24 2 33.4	7.155
5	1 47 42.76	1.9751	16 37 49.5	11.341	5	3 29 18.07	2.2691	24 9 39.1	7.037
6	1 49 41.42	1.9808	16 49 8.1	11.277	6	3 31 34.41	2.2756	24 16 37.8	6.918
7	1 51 40.40	1.9856	17 0 22.8	11.213	7	3 33 51.14	2.2821	24 23 29.3	6.798
8	1 53 39.69	1.9908	17 11 33.6	11.147	8	3 36 8.27	2.2886	24 30 13.5	6.676
9	1 55 39.31	1.9963	17 22 40.5	11.081	9	3 38 25.78	2.2951	24 36 50.4	6.553
10	1 57 39.25	2.0017	17 33 43.3	11.014	10	3 40 43.68	2.3016	24 43 19.9	6.428
11	1 59 39.52	2.0072	17 44 42.1	10.946	11	3 43 1.97	2.3081	24 49 41.9	6.303
12	2 1 40.11	2.0127	17 55 36.8	10.876	12	3 45 20.65	2.3145	24 55 56.3	6.176
13	2 3 41.04	2.0182	18 6 27.3	10.806	13	3 47 39.71	2.3209	25 2 3.1	6.048
14	2 5 42.30	2.0238	18 17 13.5	10.734	14	3 49 59.16	2.3273	25 8 2.1	5.919
15	2 7 43.90	2.0295	18 27 55.4	10.661	15	3 52 18.99	2.3336	25 13 53.4	5.789
16	2 9 45.85	2.0353	18 38 32.8	10.587	16	3 54 39.19	2.3399	25 19 36.8	5.658
17	2 11 48.14	2.0411	18 49 5.8	10.512	17	3 56 59.77	2.3462	25 25 12.3	5.525
18	2 13 50.78	2.0469	18 59 34.3	10.436	18	3 59 20.73	2.3524	25 30 39.8	5.391
19	2 15 53.77	2.0527	19 9 58.2	10.359	19	4 1 42.06	2.3586	25 35 59.2	5.256
20	2 17 57.11	2.0587	19 20 17.4	10.281	20	4 4 3.76	2.3647	25 41 10.4	5.120
21	2 20 0.81	2.0646	19 30 31.9	10.202	21	4 6 25.83	2.3708	25 46 13.4	4.982
22	2 22 4.86	2.0705	19 40 41.6	10.121	22	4 8 48.26	2.3769	25 51 8.2	4.842
23	2 24 9.27	2.0766	19 50 46.4	10.039	23	4 11 11.05	2.3829	25 55 54.6	4.702
24	2 26 14.05	2.0827	N.20 0 46.3	9.956	24	4 13 34.21	2.3889	N.26 0 32.5	4.561



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 29.					THURSDAY, MARCH 1.				
0	4 13 34.21	2.3690	N.26 0 32.5	4.561	0	5 12 26.97	2.5097	N.27 6 37.7	0.850
1	4 15 57.72	2.3648	26 5 1.9	4.418	PHASES OF THE MOON.				
2	4 18 21.58	2.4006	26 9 22.7	4.275					
3	4 20 45.79	2.4064	26 13 34.9	4.130					
4	4 23 10.35	2.4121	26 17 38.4	3.984	☾ Full Moon, : . 6 14 35.4				
5	4 25 35.25	2.4178	26 21 33.1	3.887					
6	4 28 0.48	2.4234	26 25 18.9	3.680					
7	4 30 26.05	2.4289	26 28 55.8	3.540	☾ Last Quarter, . . 13 6 51.3				
8	4 32 51.94	2.4343	26 32 23.7	3.390					
9	4 35 18.16	2.4397	26 35 42.6	3.289					
10	4 37 44.70	2.4450	26 38 52.3	3.087	☾ New Moon, . . 21 7 38.6				
11	4 40 11.56	2.4502	26 41 52.9	2.983					
12	4 42 38.72	2.4553	26 44 44.3	2.778					
13	4 45 6.19	2.4603	26 47 26.4	2.623	☾ First Quarter, . 29 7 55.3				
14	4 47 33.96	2.4653	26 49 59.0	2.467					
15	4 50 2.03	2.4702	26 52 22.2	2.309	☾ Perigee, . . . . 7 1.6				
16	4 52 30.38	2.4750	26 54 35.9	2.150					
17	4 54 59.02	2.4798	26 56 40.1	1.991					
18	4 57 27.94	2.4843	26 58 34.7	1.831	☾ Apogee, . . . . 21 8.7				
19	4 59 57.13	2.4887	27 0 19.7	1.669					
20	5 2 26.59	2.4931	27 1 54.9	1.507					
21	5 4 56.31	2.4974	27 3 20.4	1.344					
22	5 7 26.28	2.5016	27 4 36.0	1.181					
23	5 9 56.50	2.5057	N.27 5 41.8	1.016					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
1	SUN W.	105 12 4	2964	106 43 2	2944	108 14 25	2924	109 46 13	2904
	Venus W.	75 8 52	2035	76 37 57	2035	78 7 26	2015	79 37 20	2005
	$\alpha$ Pegasi W.	65 21 27	2921	66 55 28	2798	68 29 58	2778	70 4 58	2763
	$\alpha$ Arietis W.	21 49 30	2715	23 25 50	2687	25 2 49	2657	26 40 26	2631
	Jupiter E.	50 28 59	2563	48 49 41	2666	47 9 59	2548	45 29 52	2530
	Pollux E.	53 49 42	2641	52 11 43	2634	50 33 20	2607	48 54 35	2589
	Saturn E.	86 13 7	2595	84 34 5	2577	82 54 38	2559	81 14 46	2540
	Regulus E.	90 40 17	2618	89 1 47	2601	87 22 54	2583	85 43 35	2564
2	SUN W.	117 31 46	2801	119 6 12	2780	120 41 6	2760	122 16 27	2738
	Venus W.	87 13 20	2689	88 45 53	2689	90 18 52	2647	91 52 19	2627
	$\alpha$ Pegasi W.	78 7 23	2643	79 45 20	2623	81 23 45	2601	83 2 39	2580
	$\alpha$ Arietis W.	34 57 15	2508	36 38 17	2487	38 19 49	2464	40 1 53	2442
	Jupiter E.	37 2 53	2437	35 20 11	2419	33 37 3	2401	31 53 29	2382
	Pollux E.	40 34 51	2604	38 53 43	2498	37 12 15	2472	35 30 20	2457
	Saturn E.	72 48 55	2445	71 6 25	2426	69 23 27	2407	67 40 2	2392
	Regulus E.	77 20 30	2469	75 38 32	2450	73 56 9	2430	72 13 17	2410
3	SUN W.	130 20 6	2635	131 58 13	2615	133 36 47	2596	135 15 48	2577
	Venus W.	99 46 19	2722	101 22 29	2702	102 59 6	2683	104 36 9	2663
	$\alpha$ Pegasi W.	91 24 4	2483	93 5 41	2463	94 47 43	2448	96 30 10	2431
	$\alpha$ Arietis W.	48 39 48	2337	50 24 53	2319	52 10 25	2299	53 56 26	2291
	Aldebaran W.	18 59 8	2014	20 29 4	2087	22 1 40	2058	23 36 27	2039
	Pollux E.	26 55 57	2395	25 12 15	2387	23 28 22	2364	21 44 24	2354
	Saturn E.	58 56 11	2294	57 10 3	2276	55 23 28	2258	53 36 26	2241
	Regulus E.	63 32 7	2316	61 46 31	2296	60 0 28	2280	58 13 59	2262
4	Venus W.	112 47 52	2671	114 27 27	2653	116 7 26	2638	117 47 47	2621
	$\alpha$ Pegasi W.	105 8 6	2356	106 52 44	2344	108 37 39	2333	110 22 50	2322
	$\alpha$ Arietis W.	62 53 25	2190	64 42 8	2174	66 31 15	2157	68 20 47	2142
	Aldebaran W.	31 54 24	2419	33 37 32	2380	35 21 37	2364	37 6 32	2353
	Saturn E.	44 34 53	2167	42 45 20	2141	40 55 24	2127	39 5 6	2113
	Regulus E.	49 15 0	2176	47 25 57	2161	45 36 31	2146	43 46 42	2130
	Spica E.	103 17 54	2175	101 28 54	2162	99 39 29	2146	97 49 40	2131
5	$\alpha$ Arietis W.	77 34 3	2073	79 25 44	2061	81 17 43	2050	83 10 0	2040
	Aldebaran W.	46 1 28	2189	47 50 12	2170	49 39 24	2153	51 29 3	2136
	Saturn E.	29 48 27	2052	27 56 14	2043	26 3 47	2035	24 11 7	2028
	Regulus E.	34 32 14	2066	32 40 23	2055	30 48 15	2046	28 55 52	2037
	Spica E.	88 35 6	2064	86 43 11	2062	84 50 57	2041	82 58 27	2031
6	$\alpha$ Arietis W.	92 35 1	1999	94 28 37	1993	96 22 22	1988	98 16 15	1984
	Aldebaran W.	60 42 50	2074	62 34 20	2065	64 26 22	2067	66 18 27	2060
	Jupiter W.	21 23 47	1970	23 18 8	1963	25 12 42	1956	27 7 26	1950
	Pollux W.	18 12 39	2134	20 2 47	2104	21 53 40	2079	23 45 11	2060
	Spica E.	73 32 20	1991	71 38 31	1985	69 44 33	1980	67 50 27	1975
	Mars E.	115 18 34	2185	113 29 44	2178	111 40 44	2172	109 51 34	2167
7	Aldebaran W.	75 40 56	2083	77 33 39	2082	79 26 23	2082	81 19 7	2084
	Jupiter W.	36 42 47	1988	38 38 0	1938	40 33 13	1939	42 28 24	1941
	Pollux W.	33 8 28	2009	35 1 48	2005	36 55 14	2003	38 48 43	2003
	Spica E.	58 18 46	1908	56 24 21	1908	54 29 57	1970	52 35 36	1974
	Mars E.	100 44 17	2155	98 54 42	2155	97 5 7	2157	95 15 34	2158
	Antares E.	104 6 16	1960	102 11 39	1960	100 17 2	1962	98 22 27	1964



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
1	SUN	W.	111 18 27	2883	112 51 7	2863	114 24 13	2842	115 57 46	2821
	Venus	W.	81 7 39	2973	82 38 25	2953	84 9 37	2932	85 41 15	2911
	α Pegasi	W.	71 40 27	2730	73 16 27	2707	74 52 57	2687	76 29 55	2664
	α Arietis	W.	28 18 39	2908	29 57 27	2890	31 36 49	2855	33 16 46	2832
	Jupiter	E.	43 49 20	2511	42 8 22	2492	40 26 58	2475	38 45 9	2455
	Pollux	E.	47 15 25	2873	45 35 52	2855	43 55 55	2838	42 15 35	2821
	Saturn	E.	79 34 28	2521	77 53 44	2502	76 12 34	2484	74 30 58	2465
	Regulus	E.	84 3 50	2545	82 23 40	2526	80 43 3	2507	79 2 0	2488
2	SUN	W.	123 52 16	2718	125 28 32	2697	127 5 16	2677	128 42 27	2656
	Venus	W.	93 26 12	2806	95 0 33	2785	96 35 21	2763	98 10 37	2744
	α Pegasi	W.	84 42 1	2560	86 21 51	2540	88 2 9	2521	89 42 53	2502
	α Arietis	W.	41 44 28	2421	43 27 33	2400	45 11 8	2379	46 55 13	2358
	Jupiter	E.	30 9 28	2364	28 25 2	2345	26 40 10	2323	24 54 52	2311
	Pollux	E.	33 46 6	2442	32 5 31	2429	30 22 37	2416	28 39 25	2405
	Saturn	E.	65 56 10	2369	64 11 51	2350	62 27 5	2332	60 41 52	2313
	Regulus	E.	70 29 57	2391	68 46 10	2373	67 1 56	2354	65 17 15	2335
3	SUN	W.	136 55 15	2558	138 35 8	2538	140 15 28	2520	141 56 13	2502
	Venus	W.	106 13 38	2644	107 51 33	2625	109 29 54	2606	111 8 41	2588
	α Pegasi	W.	98 13 1	2415	99 56 15	2399	101 39 51	2384	103 23 48	2370
	α Arietis	W.	55 42 55	2261	57 29 52	2242	59 17 17	2225	61 5 8	2207
	Aldebaran	W.	25 13 10	2626	26 51 29	2603	28 31 15	2580	30 12 15	2460
	Pollux	E.	20 0 27	2392	18 16 41	2408	16 33 18	2431	14 50 28	2465
	Saturn	E.	51 48 59	2223	50 1 5	2206	48 12 46	2189	46 24 2	2173
	Regulus	E.	56 27 3	2244	54 39 41	2227	52 51 53	2209	51 3 39	2192
4	Venus	W.	119 28 31	2806	121 9 36	2492	122 51 1	2475	124 32 46	2464
	α Pegasi	W.	112 8 17	2813	113 53 58	2805	115 39 50	2298	117 25 52	2292
	α Arietis	W.	70 10 42	2127	72 1 0	2113	73 51 40	2099	75 42 41	2085
	Aldebaran	W.	38 52 13	2284	40 38 36	2258	42 25 38	2233	44 13 16	2210
	Saturn	E.	37 14 25	2099	35 23 24	2086	33 32 4	2073	31 40 24	2062
	Regulus	E.	41 56 29	2116	40 5 55	2103	38 15 1	2090	36 23 47	2078
	Spica	E.	95 59 28	2116	94 8 54	2102	92 17 58	2089	90 26 42	2076
5	α Arietis	W.	85 2 32	2080	86 55 20	2021	88 48 21	2013	90 41 35	2005
	Aldebaran	W.	53 19 7	2123	55 9 33	2108	57 0 20	2096	58 51 27	2085
	Saturn	E.	22 18 16	2024	20 25 19	2021	18 32 17	2020	16 39 14	2023
	Regulus	E.	27 3 15	2029	25 10 26	2022	23 17 26	2016	21 24 17	2013
	Spica	E.	81 5 41	2021	79 12 40	2012	77 19 25	2005	75 25 58	1998
6	α Arietis	W.	100 10 15	1981	102 4 19	1973	103 58 28	1977	105 52 39	1975
	Aldebaran	W.	68 10 43	2045	70 3 7	2041	71 55 38	2037	73 48 15	2034
	Jupiter	W.	29 2 19	1946	30 57 19	1942	32 52 25	1939	34 47 35	1938
	Pollux	W.	25 37 12	2044	27 29 37	2033	29 22 20	2023	31 15 18	2016
	Spica	E.	65 56 14	1973	64 1 57	1970	62 7 36	1968	60 13 11	1968
	Mars	E.	108 2 16	2163	106 12 52	2159	104 23 23	2157	102 33 51	2156
7	Aldebaran	W.	83 11 48	2037	85 4 25	2040	86 56 57	2044	88 49 22	2060
	Jupiter	W.	44 23 32	1943	46 18 36	1947	48 13 34	1951	50 8 25	1956
	Pollux	W.	40 42 13	2002	42 35 44	2004	44 29 12	2005	46 22 37	2009
	Spica	E.	50 41 20	1977	48 47 9	1981	46 53 4	1986	44 59 9	1993
	Mars	E.	93 26 3	2161	91 36 37	2165	89 47 17	2170	87 58 5	2176
	Antares	E.	96 27 56	1967	94 33 29	1971	92 39 9	1975	90 44 55	1981



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
8	Aldebaran	W.	90 41 39	2066	92 33 46	2063	94 25 42	2071	96 17 26	2079
	Jupiter	W.	52 3 8	1963	53 57 41	1969	55 52 4	1977	57 46 15	1985
	Pollux	W.	48 15 57	2014	50 9 10	2019	52 2 14	2026	53 55 9	2032
	Saturn	W.	16 17 11	2009	18 10 31	2009	20 3 51	2010	21 57 10	2013
	Spica	E.	43 5 23	2000	41 11 48	2007	39 18 25	2016	37 25 16	2026
	Mars	E.	86 9 1	2182	84 20 6	2189	82 31 22	2196	80 42 49	2206
	Antares	E.	88 50 50	1987	86 56 55	1993	85 3 10	2001	83 9 37	2009
9	Jupiter	W.	67 13 36	2035	69 6 15	2048	70 58 35	2060	72 50 36	2073
	Pollux	W.	63 16 32	2079	65 8 3	2091	66 59 16	2108	68 50 11	2116
	Saturn	W.	31 21 40	2082	33 13 54	2092	35 5 52	2073	36 57 33	2085
	Regulus	W.	26 14 51	2073	28 6 32	2083	29 57 57	2095	31 49 4	2107
	Spica	E.	28 3 43	2088	26 12 26	2104	24 21 33	2122	22 31 7	2141
	Mars	E.	71 43 43	2280	69 56 45	2273	68 10 6	2286	66 23 46	2300
	Antares	E.	73 45 27	2061	71 53 27	2072	70 1 45	2085	68 10 23	2098
10	Jupiter	W.	82 5 23	2145	83 55 13	2161	85 44 40	2177	87 33 42	2194
	Pollux	W.	77 59 39	2186	79 48 27	2202	81 36 52	2219	83 24 53	2234
	Saturn	W.	46 11 1	2153	48 0 39	2169	49 49 54	2184	51 38 46	2200
	Regulus	W.	40 59 44	2176	42 48 47	2192	44 37 27	2207	46 25 44	2223
	Mars	E.	57 37 35	2380	55 53 32	2397	54 9 53	2415	52 26 39	2433
	Antares	E.	58 58 44	2170	57 9 32	2186	55 20 43	2202	53 32 18	2218
	SUN	E.	132 14 24	2482	130 32 45	2499	128 51 30	2516	127 10 39	2534
11	Jupiter	W.	96 32 40	2278	98 19 12	2296	100 5 18	2313	101 50 58	2331
	Saturn	W.	60 36 58	2283	62 23 24	2300	64 9 21	2317	65 54 55	2335
	Regulus	W.	55 21 7	2307	57 6 57	2324	58 52 22	2341	60 37 22	2359
	Mars	E.	43 57 12	2330	42 16 41	2352	40 36 40	2372	38 57 7	2394
	Antares	E.	44 36 25	2303	42 50 30	2320	41 5 0	2337	39 19 55	2355
	SUN	E.	118 52 34	2624	117 14 12	2643	115 36 16	2663	113 58 46	2681
12	Saturn	W.	74 36 27	2422	76 19 30	2440	78 2 8	2457	79 44 22	2474
	Regulus	W.	69 16 0	2446	70 58 29	2464	72 40 33	2482	74 22 12	2499
	Spica	W.	15 26 6	2518	17 6 54	2522	18 47 36	2530	20 28 7	2540
	Antares	E.	30 40 54	2444	28 58 22	2461	27 16 14	2479	25 34 31	2496
	Mars	E.	30 47 4	2712	29 10 40	2739	27 34 52	2766	25 59 40	2795
	SUN	E.	105 57 33	2776	104 22 34	2796	102 48 0	2815	101 13 51	2833
13	Saturn	W.	88 9 33	2556	89 49 26	2574	91 28 56	2591	93 8 3	2606
	Regulus	W.	82 44 30	2583	84 23 48	2599	86 2 44	2615	87 41 18	2632
	Spica	W.	28 46 47	2604	30 25 36	2618	32 4 6	2632	33 42 17	2647
	SUN	E.	93 29 3	2625	91 57 16	2642	90 25 51	2660	88 54 48	2677
14	Saturn	W.	101 18 27	2682	102 55 31	2696	104 32 16	2711	106 8 41	2724
	Regulus	W.	95 48 48	2707	97 25 18	2722	99 1 28	2735	100 37 21	2750
	Spica	W.	41 48 21	2718	43 24 37	2732	45 0 35	2744	46 36 16	2758
	SUN	E.	81 24 49	2680	79 55 50	2675	78 23 10	2691	76 58 49	2705
15	Saturn	W.	114 6 30	2786	115 41 14	2800	117 15 42	2812	118 49 54	2823
	Spica	W.	54 30 25	2820	56 4 27	2831	57 38 14	2843	59 11 46	2853
	SUN	E.	69 41 27	2875	68 14 48	2888	66 48 25	2901	65 22 17	2914
16	Spica	W.	66 56 4	2906	68 28 17	2913	70 0 19	2923	71 32 9	2931
	Antares	W.	21 3 51	2896	22 36 13	2907	24 8 23	2916	25 40 22	2924
	Mars	W.	19 40 36	3268	21 5 25	3269	22 30 25	3262	23 55 33	3247



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
8	Aldebaran W.	98 8 57	2089	100 0 13	2100	101 51 12	2111	103 41 54	2122
	Jupiter W.	59 40 13	1994	61 33 57	2003	63 27 26	2013	65 20 40	2025
	Pollux W.	55 47 53	2041	57 40 24	2049	59 32 42	2059	61 24 45	2069
	Saturn W.	23 50 24	2018	25 43 30	2026	27 36 26	2032	29 29 10	2041
	Spica E.	35 32 22	2086	33 39 44	2048	31 47 24	2060	29 55 23	2073
	Mars E.	78 54 29	2214	77 6 23	2226	75 18 33	2236	73 30 59	2248
	Antares E.	81 16 17	2018	79 23 11	2028	77 30 20	2038	75 37 45	2049
9	Jupiter W.	74 42 16	2087	76 33 35	2100	78 24 34	2115	80 15 10	2130
	Pollux W.	70 40 46	2129	72 31 1	2143	74 20 55	2157	76 10 28	2171
	Saturn W.	38 48 55	2098	40 39 57	2111	42 30 39	2124	44 21 1	2139
	Regulus W.	33 39 52	2120	35 30 21	2133	37 20 30	2147	39 10 18	2161
	Spica E.	20 41 10	2163	18 51 46	2188	17 2 58	2216	15 14 54	2251
	Mars E.	64 37 47	2315	62 52 10	2331	61 6 55	2346	59 22 3	2363
	Antares E.	66 19 20	2111	64 28 38	2126	62 38 18	2140	60 48 20	2155
10	Jupiter W.	89 22 19	2210	91 10 32	2227	92 58 20	2242	94 45 43	2261
	Pollux W.	85 12 30	2261	86 59 42	2267	88 46 30	2283	90 32 54	2299
	Saturn W.	53 27 13	2217	55 15 15	2233	57 2 54	2249	58 50 9	2266
	Regulus W.	48 13 38	2229	50 1 7	2256	51 48 12	2273	53 34 52	2289
	Mars E.	50 43 52	2452	49 1 31	2470	47 19 36	2491	45 38 10	2511
	Antares E.	51 44 18	2285	49 56 42	2292	48 9 32	2298	46 22 46	2303
	SUN E.	125 30 13	2351	123 50 11	2369	122 10 34	2387	120 31 21	2406
11	Jupiter W.	103 36 13	2348	105 21 2	2366	107 5 26	2383	108 49 25	2401
	Saturn W.	67 40 4	2333	69 24 47	2370	71 9 5	2387	72 52 59	2405
	Regulus W.	62 21 56	2377	64 6 4	2394	65 49 48	2411	67 33 7	2429
	Mars E.	37 18 4	2617	35 39 32	2640	34 1 31	2663	32 24 1	2687
	Antares E.	37 35 16	2373	35 51 2	2391	34 7 14	2409	32 23 52	2426
	SUN E.	112 21 41	2700	110 45 1	2719	109 8 46	2738	107 32 57	2757
12	Saturn W.	81 26 12	2491	83 7 38	2508	84 48 40	2525	86 29 18	2542
	Regulus W.	76 3 27	2516	77 44 18	2533	79 24 45	2550	81 4 49	2566
	Spica W.	22 8 25	2561	23 48 27	2564	25 28 12	2577	27 7 39	2591
	Antares E.	23 53 12	2614	22 12 18	2630	20 31 47	2648	18 51 40	2664
	Mars E.	24 25 6	2626	22 51 14	2662	21 18 6	2690	19 45 47	2712
	SUN E.	99 40 6	2692	98 6 45	2670	96 33 48	2688	95 1 14	2696
13	Saturn W.	94 46 50	2622	96 25 15	2638	98 3 19	2652	99 41 3	2667
	Regulus W.	89 19 30	2648	90 57 20	2663	92 34 49	2678	94 11 59	2693
	Spica W.	35 20 8	2692	36 57 39	2676	38 34 52	2690	40 11 46	2704
	SUN E.	87 24 6	2694	85 53 46	2611	84 23 47	2627	82 54 8	2643
14	Saturn W.	107 44 49	2727	109 20 40	2750	110 56 14	2768	112 31 30	2775
	Regulus W.	102 12 54	2763	103 48 10	2777	105 23 8	2789	106 57 50	2801
	Spica W.	48 11 39	2771	49 46 45	2784	51 21 34	2795	52 56 8	2808
	SUN E.	75 30 46	2120	74 3 1	2124	72 35 33	2148	71 8 22	2162
15	Saturn W.	120 23 52	2835	121 57 35	2845	123 31 5	2855	125 4 21	2866
	Spica W.	60 45 5	2864	62 18 10	2876	63 51 1	2885	65 23 39	2895
	SUN E.	63 56 24	2225	62 30 45	2237	61 5 20	2248	59 40 8	2259
16	Spica W.	73 3 49	2989	74 35 19	2946	76 6 39	2955	77 37 48	2962
	Antares W.	27 12 10	2983	28 43 47	2941	30 15 14	2949	31 46 31	2957
	Mars W.	25 20 46	2246	26 46 1	2244	28 11 18	2245	29 36 34	2246



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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
16	SUN	E.	58 15 8	3270	56 50 21	3280	55 25 46	3290	54 1 23	3300
17	Spica	W.	79 8 48	2968	80 39 39	2977	82 10 21	2983	83 40 55	2989
	Antares	W.	33 17 38	2962	34 48 39	2973	36 10 27	2977	37 50 8	2983
	Mars	W.	31 1 49	3247	32 27 2	3249	33 52 13	3252	35 17 21	3254
	SUN	E.	47 2 8	3343	45 38 46	3351	44 15 33	3356	42 52 29	3315
18	Spica	W.	91 11 55	3017	92 41 47	3022	94 11 33	3026	95 41 13	3031
	Antares	W.	45 21 43	3011	46 51 42	3017	48 21 34	3021	49 51 21	3025
	Mars	W.	42 22 10	3270	43 46 57	3272	45 11 41	3276	46 36 21	3278
	SUN	E.	35 59 6	3298	34 36 47	3403	33 14 34	3409	31 52 28	3415
23	SUN	W.	18 29 59	3497	19 51 11	3496	21 12 24	3493	22 33 41	3490
	Aldebaran	E.	75 56 42	3131	74 29 10	3129	73 1 36	3128	71 34 0	3127
	Jupiter	E.	113 14 46	3040	111 45 23	3039	110 15 58	3036	108 46 30	3033
24	SUN	W.	29 21 15	3422	30 43 5	3419	32 5 0	3414	33 27 1	3408
	Aldebaran	E.	64 15 35	3119	62 47 48	3117	61 19 59	3115	59 52 8	3114
	Jupiter	E.	101 18 15	3017	99 48 23	3014	98 18 27	3009	96 48 26	3006
	Pollux	E.	106 23 21	3049	104 54 9	3047	103 24 54	3042	101 55 33	3036
25	SUN	W.	40 18 42	3378	41 41 23	3371	43 4 13	3364	44 27 11	3357
	Aldebaran	E.	52 32 23	3106	51 4 21	3106	49 36 17	3105	48 8 13	3103
	Jupiter	E.	89 16 52	2979	87 46 13	2974	86 15 28	2969	84 44 36	2962
	Pollux	E.	94 27 13	3010	92 57 13	3004	91 27 5	2998	89 56 50	2991
	Saturn	E.	125 3 15	2972	123 32 27	2966	122 1 32	2960	120 30 29	2954
26	SUN	W.	51 24 13	3316	52 48 7	3306	54 12 11	3296	55 36 27	3287
	Venus	W.	16 34 18	3686	17 53 9	3549	19 12 39	3518	20 32 43	3491
	Aldebaran	E.	40 47 47	3107	39 19 46	3110	37 51 48	3114	36 23 56	3120
	Jupiter	E.	77 8 3	2925	75 36 16	2917	74 4 19	2909	72 32 11	2900
	Pollux	E.	82 23 23	2964	80 52 13	2946	79 20 53	2933	77 49 23	2920
	Saturn	E.	112 53 1	2916	111 21 1	2908	109 48 52	2899	108 16 32	2890
27	SUN	W.	62 40 44	3232	64 6 15	3221	65 31 59	3209	66 57 58	3196
	Venus	W.	27 19 52	3363	28 42 28	3265	30 5 25	3247	31 28 42	3229
	Jupiter	E.	64 48 37	2932	63 15 16	2942	61 41 42	2931	60 7 54	2919
	Pollux	E.	70 8 57	2981	68 36 14	2971	67 3 18	2960	65 30 8	2949
	Saturn	E.	100 31 50	2841	98 58 15	2830	97 24 26	2819	95 50 23	2807
	Regulus	E.	107 3 22	2866	105 30 19	2855	103 57 3	2844	102 23 32	2832
28	SUN	W.	74 11 47	3128	75 39 23	3114	77 7 16	3099	78 35 27	3083
	Venus	W.	38 30 13	3243	39 55 31	3225	41 21 11	3209	42 47 10	3191
	Jupiter	E.	52 15 2	2757	50 39 38	2745	49 3 58	2732	47 28 1	2718
	Pollux	E.	57 40 37	2790	56 5 56	2778	54 30 59	2765	52 55 45	2752
	Saturn	E.	87 56 13	2744	86 20 32	2732	84 44 35	2719	83 8 20	2705
	Regulus	E.	94 32 4	2769	92 56 56	2756	91 21 31	2743	89 45 48	2729
29	SUN	W.	86 1 11	3002	87 31 21	2988	89 1 51	2969	90 32 43	2951
	Venus	W.	50 2 25	3101	51 30 34	3082	52 59 5	3064	54 27 59	3045
	α Arietis	W.	30 39 17	2707	32 15 48	2697	33 52 46	2686	35 30 11	2674
	Jupiter	E.	39 23 33	2646	37 45 40	2631	36 7 27	2615	34 28 53	2601
	Pollux	E.	44 55 19	2685	43 18 19	2671	41 40 53	2657	40 3 16	2643
	Saturn	E.	75 2 17	2631	73 24 4	2615	71 45 30	2599	70 6 34	2584
	Regulus	E.	81 42 24	2654	80 4 42	2639	78 26 40	2623	76 48 16	2607



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
16	SUN E.	52 37 11	3309	51 13 10	3318	49 49 19	3337	48 25 39	3335
17	Spica W.	85 11 31	2998	86 41 41	3001	88 11 53	3007	89 41 57	3012
	Antares W.	39 20 42	2989	40 51 8	2996	42 21 27	3001	43 51 38	3006
	Mars W.	36 42 26	3338	38 7 27	3360	39 32 25	3364	40 57 19	3366
	SUN E.	41 29 33	3373	40 6 45	3379	38 44 5	3386	37 21 32	3392
18	Spica W.	97 10 47	3036	98 40 16	3039	100 9 41	3043	101 39 1	3046
	Antares W.	51 21 3	3030	52 50 39	3033	54 20 11	3037	55 49 38	3040
	Mars W.	48 0 58	3361	49 25 33	3363	50 50 3	3367	52 14 30	3369
	SUN E.	30 30 29	3420	29 8 35	3425	27 46 47	3430	26 25 4	3435
23	SUN W.	23 55 1	3446	25 16 26	3441	26 37 56	3436	27 59 32	3430
	Aldebaran E.	70 6 23	3126	68 38 44	3124	67 11 3	3123	65 43 20	3120
	Jupiter E.	107 16 58	3030	105 47 23	3027	104 17 44	3024	102 48 1	3022
24	SUN W.	34 49 8	3403	36 11 21	3397	37 33 41	3391	38 56 8	3385
	Aldebaran E.	58 24 15	3112	56 56 20	3110	55 28 23	3109	54 0 24	3107
	Jupiter E.	95 18 19	3001	93 48 7	2996	92 17 48	2990	90 47 23	2985
	Pollux E.	100 26 5	3031	98 56 31	3027	97 26 52	3023	95 57 6	3016
25	SUN W.	45 50 17	3349	47 13 32	3341	48 36 56	3333	50 0 29	3324
	Aldebaran E.	46 40 7	3102	45 12 0	3103	43 43 54	3103	42 15 50	3105
	Jupiter E.	83 13 35	2964	81 42 25	2948	80 11 7	2941	78 39 40	2933
	Pollux E.	88 26 26	2966	86 55 54	2977	85 25 13	2970	83 54 23	2962
	Saturn E.	118 59 18	2946	117 27 58	2939	115 56 29	2931	114 24 50	2924
26	SUN W.	57 0 54	3276	58 25 33	3266	59 50 24	3256	61 15 27	3244
	Venus W.	21 53 17	3466	23 14 19	3443	24 35 47	3423	25 57 38	3402
	Aldebaran E.	34 56 11	3127	33 28 34	3126	32 1 8	3146	30 33 57	3164
	Jupiter E.	70 59 52	2961	69 27 22	2952	67 54 40	2972	66 21 45	2962
	Pollux E.	76 17 42	2920	74 45 48	2911	73 13 43	2901	71 41 26	2892
	Saturn E.	106 44 0	2961	105 11 17	2971	103 38 21	2961	102 5 12	2951
27	SUN W.	68 24 12	3183	69 50 42	3170	71 17 27	3156	72 44 28	3143
	Venus W.	32 52 20	3312	34 16 18	3294	35 40 36	3276	37 5 15	3260
	Jupiter E.	58 33 51	2907	56 59 32	2794	55 24 58	2783	53 50 8	2771
	Pollux E.	63 56 44	2938	62 23 5	2926	60 49 11	2915	59 15 2	2902
	Saturn E.	94 16 4	2796	92 41 30	2784	91 6 41	2772	89 31 36	2768
	Regulus E.	100 49 46	2921	99 15 45	2909	97 41 28	2796	96 6 55	2782
28	SUN W.	80 3 57	3068	81 32 46	3062	83 1 54	3056	84 31 22	3049
	Venus W.	44 13 30	3173	45 40 11	3155	47 7 14	3137	48 34 39	3119
	Jupiter E.	45 51 45	2704	44 15 11	2690	42 38 18	2675	41 1 5	2661
	Pollux E.	51 20 14	2738	49 44 25	2725	48 8 18	2713	46 31 54	2696
	Saturn E.	81 31 47	2699	79 54 53	2676	78 17 41	2661	76 40 9	2646
	Regulus E.	88 9 47	2714	86 33 26	2699	84 56 45	2685	83 19 45	2669
29	SUN W.	92 3 57	2933	93 35 34	2918	95 7 33	2906	96 39 55	2890
	Venus W.	55 57 16	3026	57 26 57	3007	58 57 1	2987	60 27 30	2968
	α Arietis W.	37 8 2	2927	38 46 20	2907	40 25 5	2898	42 4 16	2889
	Jupiter E.	32 49 59	2595	31 10 43	2589	29 31 6	2583	27 51 7	2577
	Pollux E.	38 25 20	2630	36 47 6	2618	35 8 35	2604	33 29 46	2592
	Saturn E.	68 27 17	2567	66 47 37	2551	65 7 35	2534	63 27 9	2519
	Regulus E.	75 9 30	2590	73 30 21	2573	71 50 49	2557	70 10 55	2540



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.			
		h. m. s.	s.		° ' "	"				
Thur.	1	22 50 34.01	9.349	S. 7 22 37.3	57.12	16' 10.20	65.39	12 29.22	0.507	
Fri.	2	22 54 18.07	9.328	6 59 43.5	57.36	16 9.96	65.32	12 16.77	0.528	
Sat.	3	22 58 1.63	9.308	6 36 44.0	57.59	16 9.72	65.25	12 3.82	0.549	
Sun.	4	23 1 44.71	9.288	6 13 39.3	57.81	16 9.47	65.18	11 50.39	0.569	
Mon.	5	23 5 27.34	9.269	5 50 29.6	58.02	16 9.22	65.12	11 36.49	0.587	
Tues.	6	23 9 9.55	9.251	5 27 14.9	58.21	16 8.96	65.06	11 22.19	0.604	
Wed.	7	23 12 51.35	9.234	5 3 55.9	58.38	16 8.70	65.00	11 7.48	0.621	
Thur.	8	23 16 32.76	9.219	4 40 33.0	58.58	16 8.44	64.94	10 52.37	0.638	
Fri.	9	23 20 13.81	9.205	4 17 6.5	58.67	16 8.18	64.89	10 36.90	0.653	
Sat.	10	23 23 54.53	9.191	3 53 36.7	58.81	16 7.92	64.84	10 21.10	0.665	
Sun.	11	23 27 34.92	9.178	3 30 3.9	58.93	16 7.65	64.79	10 4.99	0.677	
Mon.	12	23 31 15.01	9.166	3 6 28.6	59.03	16 7.38	64.75	9 48.57	0.689	
Tues.	13	23 34 54.84	9.156	2 42 51.2	59.11	16 7.11	64.71	9 31.88	0.700	
Wed.	14	23 38 34.41	9.146	2 19 11.9	59.18	16 6.83	64.67	9 14.94	0.710	
Thur.	15	23 42 13.75	9.137	1 55 31.2	59.23	16 6.55	64.64	8 57.78	0.719	
Fri.	16	23 45 52.90	9.129	1 31 49.4	59.27	16 6.28	64.61	8 40.43	0.727	
Sat.	17	23 49 31.86	9.122	1 8 6.8	59.29	16 6.01	64.58	8 22.89	0.735	
Sun.	18	23 53 10.64	9.115	0 44 23.9	59.29	16 5.73	64.55	8 5.16	0.742	
Mon.	19	23 56 49.27	9.109	S. 0 20 41.1	59.29	16 5.45	64.53	7 47.29	0.749	
Tues.	20	0 0 27.77	9.104	N. 0 3 1.4	59.27	16 5.17	64.51	7 29.29	0.753	
Wed.	21	0 4 6.15	9.100	0 26 43.1	59.23	16 4.90	64.49	7 11.16	0.757	
Thur.	22	0 7 44.44	9.097	0 50 23.6	59.16	16 4.63	64.48	6 52.95	0.761	
Fri.	23	0 11 22.67	9.094	1 14 2.3	59.08	16 4.35	64.47	6 34.68	0.764	
Sat.	24	0 15 0.83	9.091	1 37 39.0	58.99	16 4.07	64.46	6 16.34	0.767	
Sun.	25	0 18 38.93	9.088	2 1 13.4	58.89	16 3.79	64.46	5 57.94	0.768	
Mon.	26	0 22 16.98	9.088	2 24 45.0	58.77	16 3.51	64.46	5 39.48	0.768	
Tues.	27	0 25 54.99	9.088	2 48 13.5	58.63	16 3.23	64.46	5 20.99	0.768	
Wed.	28	0 29 32.99	9.089	3 11 38.6	58.48	16 2.96	64.46	5 2.49	0.769	
Thur.	29	0 33 11.05	9.090	3 34 59.8	58.31	16 2.69	64.46	4 44.04	0.767	
Fri.	30	0 36 49.17	9.092	3 58 16.8	58.13	16 2.42	64.47	4 25.66	0.765	
Sat.	31	0 40 27.37	9.095	4 21 29.4	57.94	16 2.14	64.48	4 7.35	0.761	
Sun.	32	0 44 5.65	9.099	N. 4 44 37.1	57.72	16 1.87	64.50	3 49.13	0.758	

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sideral Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time.		
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.					
		h. m. s.	s.	"	° ' "	"	"	m. s.	s.	h. m. s.	s.	"
Thur.	1	22 50	32.06	9.349	S. 7 22	49.1	57.12	12 29.33	0.507	22 38	2.73	
Fri.	2	22 54	16.16	9.328	6 59	55.2	57.36	12 16.87	0.528	22 41	59.29	
Sat.	3	22 57	59.76	9.308	6 36	55.6	57.59	12 3.92	0.549	22 45	55.84	
Sun.	4	23 1	42.88	9.288	6 13	50.7	57.81	11 50.49	0.569	22 49	52.39	
Mon.	5	23 5	25.55	9.269	5 50	40.8	58.02	11 36.60	0.587	22 53	48.95	
Tues.	6	23 9	7.80	9.251	5 27	25.9	58.21	11 22.30	0.604	22 57	45.50	
Wed.	7	23 12	49.64	9.234	5 4	6.7	58.38	11 7.59	0.621	23 1	42.05	
Thur.	8	23 16	31.09	9.219	4 40	43.6	58.53	10 52.48	0.638	23 5	38.61	
Fri.	9	23 20	12.18	9.205	4 17	16.9	58.67	10 37.01	0.653	23 9	35.17	
Sat.	10	23 23	52.94	9.191	3 53	46.9	58.81	10 21.22	0.665	23 13	31.72	
Sun.	11	23 27	33.37	9.178	3 30	13.9	58.93	10 5.10	0.677	23 17	28.27	
Mon.	12	23 31	13.50	9.166	3 6	38.3	59.03	9 48.67	0.689	23 21	24.83	
Tues.	13	23 34	53.37	9.156	2 43	0.6	59.11	9 31.99	0.700	23 25	21.38	
Wed.	14	23 38	32.99	9.146	2 19	21.0	59.18	9 15.05	0.710	23 29	17.94	
Thur.	15	23 42	12.38	9.137	1 55	40.0	59.23	8 57.89	0.719	23 33	14.49	
Fri.	16	23 45	51.57	9.129	1 31	57.9	59.27	8 40.53	0.727	23 37	11.04	
Sat.	17	23 49	30.57	9.122	1 8	15.0	59.29	8 22.98	0.735	23 41	7.59	
Sun.	18	23 53	9.40	9.115	0 44	31.8	59.29	8 5.25	0.742	23 45	4.15	
Mon.	19	23 56	48.08	9.109	S. 0 20	48.7	59.29	7 47.38	0.749	23 49	0.70	
Tues.	20	0 0	26.63	9.104	N. 0 2	54.0	59.27	7 29.38	0.753	23 52	57.25	
Wed.	21	0 4	5.06	9.100	0 26	36.1	59.23	7 11.25	0.757	23 56	53.81	
Thur.	22	0 7	43.40	9.097	0 50	16.9	59.16	6 53.04	0.761	0 0	50.36	
Fri.	23	0 11	21.68	9.094	1 13	55.9	59.06	6 34.77	0.764	0 4	46.91	
Sat.	24	0 14	59.89	9.091	1 37	32.9	58.99	6 16.43	0.767	0 8	43.46	
Sun.	25	0 18	38.04	9.088	2 1	7.6	58.89	6 58.02	0.768	0 12	40.02	
Mon.	26	0 22	16.13	9.088	2 24	39.5	58.77	5 39.56	0.768	0 16	36.57	
Tues.	27	0 25	54.19	9.088	2 48	8.3	58.63	5 21.07	0.768	0 20	33.12	
Wed.	28	0 29	32.24	9.089	3 11	33.7	58.48	5 2.56	0.768	0 24	29.68	
Thur.	29	0 33	10.34	9.090	3 34	55.2	58.31	4 44.11	0.767	0 28	26.23	
Fri.	30	0 36	48.51	9.092	3 58	12.5	58.13	4 25.72	0.765	0 32	22.79	
Sat.	31	0 40	26.75	9.095	4 21	25.4	57.94	4 7.41	0.761	0 36	19.34	
Sun.	32	0 44	5.08	9.099	N. 4 44	33.4	57.72	3 49.19	0.758	0 40	15.89	

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

		THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
Day of the Month.	Day of the Year.	True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	61	341° 10' 49.7"	10° 27.6"	150.34	+0.56	9.9963143	44.6	h. m. s. 1 21 43.84	
2	62	342 10 56.7	10 34.4	150.25	0.46	.9964223	45.2	1 17 47.93	
3	63	343 11 1.6	10 39.2	150.16	0.34	.9965316	45.9	1 13 52.02	
4	64	344 11 4.5	10 42.0	150.08	0.21	.9966424	46.5	1 9 56.11	
5	65	345 11 5.2	10 42.6	149.99	+0.08	.9967547	47.1	1 6 0.21	
6	66	346 11 3.9	10 41.2	149.91	-0.05	.9968685	47.7	1 2 4.30	
7	67	347 11 0.7	10 37.9	149.83	0.16	.9969837	48.3	0 58 8.39	
8	68	348 10 55.6	10 32.7	149.75	0.26	.9971003	48.9	0 54 12.48	
9	69	349 10 48.7	10 25.7	149.67	0.33	.9972183	49.5	0 50 16.57	
10	70	350 10 39.9	10 16.8	149.60	0.36	.9973376	50.0	0 46 20.67	
11	71	351 10 29.3	10 6.1	149.52	0.37	.9974582	50.5	0 42 24.76	
12	72	352 10 16.9	9 53.5	149.45	0.35	.9975799	50.9	0 38 28.85	
13	73	353 10 2.8	9 39.3	149.38	0.31	.9977026	51.2	0 34 32.94	
14	74	354 9 47.0	9 23.4	149.31	0.23	.9978259	51.5	0 30 37.03	
15	75	355 9 29.5	9 5.8	149.24	0.14	.9979498	51.7	0 26 41.13	
16	76	356 9 10.4	8 46.6	149.17	-0.01	.9980743	51.9	0 22 45.22	
17	77	357 8 49.5	8 25.6	149.09	+0.13	.9981991	52.0	0 18 49.31	
18	78	358 8 26.8	8 2.8	149.02	0.27	.9983241	52.0	0 14 53.40	
19	79	359 8 2.3	7 38.2	148.94	0.41	.9984490	52.0	0 10 57.49	
20	80	0 7 35.9	7 11.7	148.86	0.55	.9985739	51.9	0 7 1.59	
21	81	1 7 7.7	6 43.4	148.78	0.65	.9986986	51.9	$\left\{ \begin{smallmatrix} 0 & 0 & 5.89 \\ 23 & 59 & 5.77 \end{smallmatrix} \right.$	
22	82	2 6 37.4	6 13.0	148.70	0.74	.9988230	51.8	23 55 13.86	
23	83	3 6 5.0	5 40.5	148.61	0.81	.9989470	51.6	23 51 17.96	
24	84	4 5 30.5	5 5.9	148.52	0.84	.9990707	51.5	23 47 22.06	
25	85	5 4 53.8	4 29.1	148.43	0.84	.9991940	51.3	23 43 26.15	
26	86	6 4 14.9	3 50.1	148.33	0.82	.9993170	51.2	23 39 30.24	
27	87	7 3 33.8	3 8.9	148.24	0.77	.9994397	51.1	23 35 34.33	
28	88	8 2 50.3	2 25.3	148.14	0.68	.9995623	51.1	23 31 38.42	
29	89	9 2 4.4	1 39.3	148.04	0.57	.9996849	51.1	23 27 42.52	
30	90	10 1 16.1	0 50.9	147.94	0.45	.9998075	51.1	23 23 46.61	
31	91	11 0 25.5	0 0.2	147.84	0.33	9.9999302	51.2	23 19 50.70	
32	92	11 59 32.6	59 7.2	147.75	+0.20	0.0000531	51.3	23 15 54.79	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.

## SEMI-DIAMETER.

## HORIZONTAL PARALLAX.

## MERIDIAN PASSAGE.

## AGE.

	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
1	15 45.6	15 53.0	57 43.7	+2.24	58 11.0	+2.80	6 50.5	2.49	8.7
2	16 0.6	16 8.1	58 38.7	2.81	59 6.3	2.28	7 50.5	2.52	9.7
3	16 15.4	16 22.8	59 33.2	2.19	59 58.7	2.05	8 50.4	2.48	10.7
4	16 28.7	16 34.3	60 22.2	1.84	60 42.8	1.58	9 48.8	2.39	11.7
5	16 39.0	16 42.5	60 59.9	1.26	61 12.9	0.89	10 44.8	2.28	12.7
6	16 44.8	16 45.7	61 21.2	+0.49	61 24.6	+0.07	11 38.6	2.20	13.7
7	16 45.3	16 43.5	61 22.9	-0.34	61 16.3	-0.76	12 31.0	2.17	14.7
8	16 40.3	16 35.9	61 4.8	1.15	60 48.7	1.50	13 23.1	2.17	15.7
9	16 30.5	16 24.2	60 28.8	1.80	60 5.7	2.06	14 15.8	2.22	16.7
10	16 17.1	16 9.6	59 39.5	2.25	59 11.8	2.37	15 9.9	2.29	17.7
11	16 1.7	15 53.7	58 42.9	2.43	58 13.5	2.44	16 5.4	2.34	18.7
12	15 45.8	15 38.0	57 44.2	2.40	57 16.0	2.32	17 1.6	2.35	19.7
13	15 30.5	15 23.6	56 48.8	2.21	56 23.0	2.07	17 57.4	2.30	20.7
14	15 17.1	15 11.1	55 59.1	1.91	55 37.2	1.73	18 51.4	2.20	21.7
15	15 5.8	15 1.0	55 17.5	1.55	55 0.0	1.86	19 42.6	2.07	22.7
16	14 56.9	14 53.3	54 44.8	1.17	54 31.8	0.98	20 30.4	1.92	23.7
17	14 50.4	14 48.1	54 21.1	0.80	54 12.6	0.63	21 15.1	1.80	24.7
18	14 46.3	14 45.1	54 6.2	0.45	54 1.7	0.29	21 57.4	1.72	25.7
19	14 44.4	14 44.2	53 59.1	-0.14	53 58.2	-0.00	22 37.9	1.66	26.7
20	14 44.4	14 45.0	53 59.0	+0.12	54 1.2	+0.24	23 17.5	1.64	27.7
21	14 46.0	14 47.3	54 4.8	0.35	54 9.7	0.46	23 57.2	1.66	28.7
22	14 49.0	14 50.9	54 15.8	0.56	54 23.0	0.65	6		29.7
23	14 53.2	14 55.8	54 31.3	0.74	54 40.7	0.83	0 37.9	1.73	0.9
24	14 58.6	15 1.8	54 51.2	0.92	55 2.9	1.01	1 20.6	1.82	1.9
25	15 5.2	15 9.0	55 15.6	1.11	55 29.4	1.20	2 6.1	1.97	2.9
26	15 13.1	15 17.4	55 44.3	1.29	56 0.3	1.38	2 55.1	2.12	3.9
27	15 22.1	15 27.1	56 17.5	1.46	56 35.7	1.57	3 47.7	2.27	4.9
28	15 32.3	15 37.7	56 55.0	1.65	57 15.4	1.73	4 43.5	2.38	5.9
29	15 43.6	15 49.6	57 36.6	1.80	57 58.5	1.85	5 41.2	2.43	6.9
30	15 55.7	16 1.8	58 20.8	1.87	58 43.3	1.87	6 39.2	2.41	7.9
31	16 7.9	16 13.8	59 5.6	1.88	59 27.2	1.76	7 36.3	2.35	8.9
32	16 19.3	16 24.4	59 47.6	+1.63	60 6.2	+1.46	8 31.1	2.24	9.9



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 1.					SATURDAY 3.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	5 12 26.97	2.5097	N.27 6 37.7	0.890	0	7 15 14.99	2.5099	N.24 27 14.1	7.524
1	5 14 57.67	2.5136	27 7 23.7	0.684	1	7 17 48.53	2.5081	24 19 37.0	7.704
2	5 17 28.60	2.5174	27 7 59.7	0.516	2	7 20 21.96	2.5062	24 11 49.6	7.874
3	5 19 59.77	2.5211	27 8 25.6	0.348	3	7 22 55.27	2.5042	24 3 52.0	8.044
4	5 22 31.13	2.5246	27 8 41.4	0.178	4	7 25 28.46	2.5020	23 55 44.3	8.212
5	5 25 2.71	2.5280	27 8 47.0	0.009	5	7 28 1.52	2.5008	23 47 26.5	8.381
6	5 27 34.49	2.5312	27 8 42.4	0.162	6	7 30 34.44	2.5076	23 38 58.6	8.548
7	5 30 6.47	2.5346	27 8 27.6	0.383	7	7 33 7.22	2.5062	23 30 20.7	8.714
8	5 32 38.64	2.5377	27 8 2.5	0.504	8	7 35 30.86	2.5047	23 21 32.9	8.879
9	5 35 10.99	2.5406	27 7 27.1	0.676	9	7 38 12.35	2.5031	23 12 35.2	9.044
10	5 37 43.51	2.5435	27 6 41.4	0.849	10	7 40 44.68	2.5015	23 3 27.6	9.207
11	5 40 16.20	2.5462	27 5 45.3	1.022	11	7 43 16.85	2.5000	22 54 10.3	9.370
12	5 42 49.06	2.5488	27 4 38.8	1.196	12	7 45 48.86	2.5021	22 44 43.2	9.532
13	5 45 22.07	2.5513	27 3 21.9	1.369	13	7 48 20.70	2.5028	22 35 6.5	9.698
14	5 47 55.22	2.5537	27 1 54.5	1.544	14	7 50 52.36	2.5023	22 25 20.1	9.852
15	5 50 28.51	2.5559	27 0 16.6	1.719	15	7 53 23.85	2.5028	22 15 24.2	10.010
16	5 53 1.93	2.5581	26 58 28.2	1.895	16	7 55 55.16	2.5008	22 5 18.9	10.167
17	5 55 35.47	2.5600	26 56 29.2	2.071	17	7 58 26.28	2.5071	21 55 4.2	10.328
18	5 58 9.12	2.5618	26 54 19.7	2.247	18	8 0 57.21	2.5089	21 44 40.1	10.478
19	6 0 42.88	2.5636	26 51 59.6	2.423	19	8 3 27.95	2.5107	21 34 6.8	10.632
20	6 3 16.75	2.5652	26 49 29.0	2.600	20	8 5 58.50	2.5076	21 23 24.4	10.784
21	6 5 50.71	2.5667	26 46 47.7	2.777	21	8 8 28.85	2.5041	21 12 32.8	10.936
22	6 8 24.75	2.5680	26 43 55.8	2.954	22	8 10 58.99	2.5007	21 1 32.2	11.086
23	6 10 58.87	2.5693	N.26 40 53.3	3.131	23	8 13 28.93	2.4973	N.20 50 22.6	11.234
FRIDAY 2.					SUNDAY 4.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	6 13 33.06	2.5708	N.26 37 40.1	3.309	0	8 15 58.66	2.4987	N.20 39 4.0	11.381
1	6 16 7.31	2.5713	26 34 16.2	3.487	1	8 18 28.18	2.4992	20 27 36.6	11.527
2	6 18 41.61	2.5721	26 30 41.7	3.665	2	8 20 57.49	2.4987	20 16 0.8	11.671
3	6 21 15.96	2.5728	26 26 56.5	3.843	3	8 23 26.59	2.4981	20 4 16.2	11.814
4	6 23 50.34	2.5734	26 23 0.6	4.021	4	8 25 55.47	2.4796	19 52 23.1	11.956
5	6 26 24.76	2.5738	26 18 54.0	4.198	5	8 28 24.13	2.4766	19 40 21.5	12.096
6	6 28 59.20	2.5741	26 14 36.8	4.376	6	8 30 52.57	2.4731	19 28 11.5	12.235
7	6 31 33.66	2.5744	26 10 8.9	4.554	7	8 33 20.79	2.4694	19 15 53.3	12.373
8	6 34 8.13	2.5746	26 5 30.3	4.732	8	8 35 48.78	2.4647	19 3 26.9	12.509
9	6 36 42.60	2.5744	26 0 41.0	4.910	9	8 38 16.55	2.4609	18 50 52.4	12.643
10	6 39 17.06	2.5748	25 55 41.1	5.087	10	8 40 44.09	2.4573	18 38 9.9	12.776
11	6 41 51.51	2.5740	25 50 30.6	5.264	11	8 43 11.41	2.4534	18 25 19.4	12.908
12	6 44 25.94	2.5736	25 45 9.4	5.441	12	8 45 38.50	2.4496	18 12 21.1	13.036
13	6 47 0.34	2.5731	25 39 37.6	5.618	13	8 48 5.36	2.4468	17 59 15.2	13.163
14	6 49 34.71	2.5725	25 33 55.2	5.795	14	8 50 31.99	2.4430	17 46 1.6	13.289
15	6 52 9.03	2.5717	25 28 2.3	5.971	15	8 52 58.39	2.4392	17 32 40.5	13.413
16	6 54 43.31	2.5709	25 21 58.8	6.147	16	8 55 24.57	2.4354	17 19 12.0	13.536
17	6 57 17.54	2.5699	25 15 44.8	6.323	17	8 57 50.51	2.4305	17 5 36.2	13.657
18	6 59 51.70	2.5688	25 9 20.2	6.497	18	9 0 16.22	2.4266	16 51 53.2	13.776
19	7 2 25.80	2.5676	25 2 45.2	6.671	19	9 2 41.70	2.4228	16 38 3.1	13.893
20	7 4 59.81	2.5662	24 55 59.7	6.845	20	9 5 6.96	2.4189	16 24 6.0	14.009
21	7 7 33.74	2.5647	24 49 3.8	7.018	21	9 7 31.98	2.4151	16 10 2.0	14.123
22	7 10 7.59	2.5632	24 41 57.6	7.191	22	9 9 56.77	2.4113	15 55 51.2	14.236
23	7 12 41.34	2.5616	24 34 41.0	7.363	23	9 12 21.34	2.4076	15 41 33.7	14.346
24	7 15 14.99	2.5599	N.24 27 14.1	7.534	24	9 14 45.68	2.4038	N.15 27 9.7	14.454



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 5.					WEDNESDAY 7.				
0	9 14 45.68	2.4088	N. 15 27 9.7	14.454	0	11 6 26.98	2.2697	N. 2 25 15.9	17.343
1	9 17 9.79	2.4000	15 12 39.2	14.561	1	11 8 43.12	2.2683	2 7 55.1	17.363
2	9 19 33.68	2.3962	14 58 2.4	14.666	2	11 10 59.18	2.2670	1 50 33.7	17.380
3	9 21 57.34	2.3926	14 43 19.3	14.769	3	11 13 15.16	2.2656	1 33 11.9	17.395
4	9 24 20.78	2.3888	14 28 30.1	14.870	4	11 15 31.07	2.2646	1 15 49.9	17.369
5	9 26 43.99	2.3851	14 13 34.9	14.970	5	11 17 46.91	2.2636	0 58 27.7	17.370
6	9 29 6.99	2.3814	13 58 33.7	15.067	6	11 20 2.69	2.2625	0 41 5.5	17.369
7	9 31 29.77	2.3778	13 43 26.7	15.163	7	11 22 18.41	2.2616	0 23 43.4	17.367
8	9 33 52.33	2.3742	13 28 14.1	15.257	8	11 24 34.08	2.2607	N. 0 6 21.5	17.362
9	9 36 14.68	2.3706	13 12 55.9	15.349	9	11 26 49.70	2.2599	S. 0 11 0.1	17.356
10	9 38 36.81	2.3671	12 57 32.3	15.438	10	11 29 5.27	2.2592	0 28 21.2	17.347
11	9 40 58.73	2.3636	12 42 3.3	15.526	11	11 31 20.80	2.2586	0 45 41.7	17.336
12	9 43 20.44	2.3601	12 26 29.1	15.612	12	11 33 36.30	2.2580	1 3 1.6	17.328
13	9 45 41.94	2.3566	12 10 49.6	15.696	13	11 35 51.76	2.2575	1 20 20.6	17.306
14	9 48 3.24	2.3532	11 55 5.6	15.777	14	11 38 7.20	2.2571	1 37 38.6	17.291
15	9 50 24.34	2.3499	11 39 16.5	15.857	15	11 40 22.61	2.2567	1 54 55.6	17.273
16	9 52 45.24	2.3466	11 23 22.7	15.935	16	11 42 38.00	2.2563	2 12 11.3	17.262
17	9 55 5.94	2.3434	11 7 24.3	16.011	17	11 44 53.38	2.2561	2 29 25.7	17.228
18	9 57 26.45	2.3402	10 51 21.4	16.084	18	11 47 8.74	2.2559	2 46 38.7	17.208
19	9 59 46.76	2.3370	10 35 14.2	16.156	19	11 49 24.09	2.2558	3 3 50.1	17.177
20	10 2 6.88	2.3339	10 19 2.7	16.226	20	11 51 39.43	2.2557	3 20 59.9	17.147
21	10 4 26.82	2.3308	10 2 47.1	16.294	21	11 53 54.78	2.2556	3 38 7.9	17.117
22	10 6 46.58	2.3278	9 46 27.4	16.360	22	11 56 10.13	2.2556	3 55 14.0	17.084
23	10 9 6.15	2.3248	N. 9 30 3.8	16.424	23	11 58 25.49	2.2561	S. 4 12 18.0	17.060
TUESDAY 6.					THURSDAY 8.				
0	10 11 25.55	2.3218	N. 9 13 36.5	16.486	0	12 0 40.86	2.2563	S. 4 29 19.0	17.013
1	10 13 44.77	2.3189	8 57 5.6	16.545	1	12 2 56.24	2.2566	4 46 19.6	16.976
2	10 16 3.82	2.3161	8 40 31.2	16.602	2	12 5 11.65	2.2570	5 3 16.9	16.934
3	10 18 22.71	2.3134	8 23 53.3	16.657	3	12 7 27.08	2.2574	5 20 11.7	16.892
4	10 20 41.43	2.3107	8 7 12.0	16.710	4	12 9 42.54	2.2579	5 37 4.0	16.847
5	10 22 59.99	2.3080	7 50 27.6	16.763	5	12 11 58.03	2.2584	5 53 53.5	16.802
6	10 25 18.39	2.3054	7 33 40.3	16.811	6	12 14 13.55	2.2590	6 10 40.2	16.764
7	10 27 36.64	2.3029	7 16 50.2	16.869	7	12 16 29.11	2.2597	6 27 24.0	16.704
8	10 29 54.74	2.3004	6 59 57.2	16.904	8	12 18 44.72	2.2605	6 44 4.7	16.631
9	10 32 12.69	2.2980	6 43 1.6	16.948	9	12 21 0.37	2.2613	7 0 42.2	16.596
10	10 34 30.50	2.2956	6 26 3.6	16.989	10	12 23 16.07	2.2622	7 17 16.5	16.543
11	10 36 48.17	2.2933	6 9 3.2	17.028	11	12 25 31.83	2.2631	7 33 47.4	16.485
12	10 39 5.70	2.2911	5 52 0.5	17.064	12	12 27 47.64	2.2640	7 50 14.8	16.426
13	10 41 23.10	2.2890	5 34 55.6	17.099	13	12 30 3.51	2.2651	8 6 38.6	16.366
14	10 43 40.38	2.2869	5 17 48.6	17.131	14	12 32 19.45	2.2662	8 22 58.7	16.303
15	10 45 57.53	2.2849	5 0 39.8	17.162	15	12 34 35.45	2.2673	8 39 15.0	16.239
16	10 48 14.56	2.2829	4 43 29.2	17.190	16	12 36 51.52	2.2685	8 55 27.4	16.172
17	10 50 31.47	2.2810	4 26 17.0	17.217	17	12 39 7.67	2.2697	9 11 35.8	16.105
18	10 52 48.27	2.2792	4 9 3.2	17.241	18	12 41 23.89	2.2710	9 27 40.0	16.035
19	10 55 4.97	2.2774	3 51 48.1	17.263	19	12 43 40.19	2.2724	9 43 40.0	15.964
20	10 57 21.56	2.2757	3 34 31.7	17.283	20	12 45 56.58	2.2739	9 59 35.7	15.891
21	10 59 38.05	2.2741	3 17 14.2	17.301	21	12 48 13.06	2.2753	10 15 27.0	15.817
22	11 1 54.45	2.2726	2 59 55.6	17.317	22	12 50 29.62	2.2768	10 31 13.7	15.740
23	11 4 10.76	2.2711	2 42 36.1	17.331	23	12 52 46.27	2.2783	10 46 55.8	15.662
24	11 6 26.98	2.2697	N. 2 25 15.9	17.343	24	12 55 3.02	2.2800	S. 11 2 33.1	15.581



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 9.					SUNDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	12 55 3.09	2.9800	S. 11 2 33.1	15.861	0	14 46 53.38	2.9887	S. 21 30 21.8	10.087
1	12 57 19.87	2.9816	11 18 5.6	15.800	1	14 49 16.47	2.9888	21 40 22.8	9.845
2	12 59 36.81	2.9832	11 33 33.1	15.416	2	14 51 39.66	2.9878	21 50 15.2	9.802
3	13 1 53.86	2.9849	11 48 55.6	15.332	3	14 54 2.98	2.9897	21 59 59.0	9.636
4	13 4 11.02	2.9866	12 4 12.9	15.344	4	14 56 26.42	2.9916	22 9 34.2	9.514
5	13 6 28.28	2.9886	12 19 24.9	15.187	5	14 58 49.97	2.9934	22 19 0.7	9.369
6	13 8 45.66	2.9905	12 34 31.6	15.067	6	15 1 13.63	2.9953	22 28 18.5	9.223
7	13 11 3.14	2.9924	12 49 33.0	14.977	7	15 3 37.40	2.9971	22 37 27.5	9.077
8	13 13 20.74	2.9943	13 4 28.9	14.864	8	15 6 1.28	2.9988	22 46 27.6	8.938
9	13 15 38.46	2.9963	13 19 19.2	14.790	9	15 8 25.26	2.4006	22 55 18.9	8.780
10	13 17 56.30	2.9983	13 34 3.7	14.684	10	15 10 49.34	2.4022	23 4 1.9	8.632
11	13 20 14.26	2.9998	13 48 42.6	14.597	11	15 13 13.52	2.4038	23 12 34.6	8.483
12	13 22 32.34	2.9994	14 3 15.6	14.498	12	15 15 37.79	2.4053	23 20 59.1	8.333
13	13 24 50.55	2.9945	14 17 42.5	14.398	13	15 18 2.15	2.4067	23 29 14.5	8.182
14	13 27 8.88	2.9966	14 32 3.4	14.298	14	15 20 26.60	2.4082	23 37 20.9	8.031
15	13 29 27.34	2.9987	14 46 18.1	14.198	15	15 22 51.14	2.4098	23 45 18.2	7.880
16	13 31 45.93	2.9999	15 0 26.6	14.098	16	15 25 15.75	2.4108	23 53 6.5	7.738
17	13 34 4.65	2.9981	15 14 28.7	13.993	17	15 27 40.44	2.4131	24 0 45.6	7.576
18	13 36 33.50	2.9963	15 28 24.5	13.878	18	15 30 5.30	2.4132	24 8 15.5	7.422
19	13 38 42.49	2.9976	15 42 13.8	13.767	19	15 32 30.03	2.4144	24 15 36.3	7.269
20	13 41 1.61	2.9998	15 55 56.5	13.666	20	15 34 54.93	2.4156	24 22 47.8	7.116
21	13 43 20.87	2.9981	16 9 32.5	13.544	21	15 37 19.89	2.4166	24 29 50.1	6.961
22	13 45 40.26	2.9944	16 23 1.8	13.421	22	15 39 44.91	2.4174	24 36 43.1	6.806
23	13 47 59.80	2.9987	S. 16 36 24.3	13.317	23	15 42 9.98	2.4182	S. 24 43 26.8	6.650
SATURDAY 10.					MONDAY 12.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	13 50 19.47	2.9960	S. 16 49 39.9	13.201	0	15 44 35.09	2.4189	S. 24 50 1.2	6.495
1	13 52 39.28	2.9913	17 2 48.6	13.083	1	15 47 0.25	2.4197	24 56 26.3	6.340
2	13 54 59.23	2.9937	17 15 50.2	12.967	2	15 49 25.45	2.4208	25 2 42.0	6.184
3	13 57 19.32	2.9960	17 28 44.7	12.848	3	15 51 50.68	2.4208	25 8 48.4	6.028
4	13 59 39.55	2.9983	17 41 32.0	12.737	4	15 54 15.95	2.4213	25 14 45.4	5.872
5	14 1 59.92	2.9907	17 54 12.0	12.606	5	15 56 41.24	2.4217	25 20 33.0	5.716
6	14 4 20.44	2.9931	18 6 44.7	12.482	6	15 59 6.56	2.4220	25 26 11.9	5.568
7	14 6 41.10	2.9954	18 19 9.9	12.368	7	16 1 31.89	2.4223	25 31 40.0	5.421
8	14 9 1.90	2.9977	18 31 27.7	12.252	8	16 3 57.23	2.4228	25 36 59.3	5.264
9	14 11 22.83	2.9991	18 43 37.9	12.107	9	16 6 22.57	2.4234	25 42 9.2	5.095
10	14 13 43.91	2.9995	18 55 40.5	11.979	10	16 8 47.92	2.4234	25 47 9.6	4.929
11	14 16 5.13	2.9948	19 7 35.4	11.861	11	16 11 13.26	2.4238	25 52 0.6	4.771
12	14 18 26.49	2.9972	19 19 22.6	11.721	12	16 13 38.60	2.4232	25 56 42.1	4.614
13	14 20 47.99	2.9966	19 31 1.9	11.580	13	16 16 3.92	2.4219	26 1 14.2	4.456
14	14 23 9.63	2.9918	19 42 33.4	11.448	14	16 18 29.23	2.4216	26 5 36.8	4.299
15	14 25 31.41	2.9641	19 53 57.0	11.326	15	16 20 54.51	2.4211	26 9 50.0	4.141
16	14 27 53.32	2.9663	20 5 12.5	11.182	16	16 23 19.76	2.4206	26 13 53.7	3.984
17	14 30 15.37	2.9686	20 16 20.0	11.067	17	16 25 44.97	2.4200	26 17 47.9	3.826
18	14 32 37.55	2.9708	20 27 19.3	10.921	18	16 28 10.15	2.4198	26 21 32.7	3.668
19	14 34 59.86	2.9730	20 38 10.5	10.784	19	16 30 35.28	2.4198	26 25 8.1	3.511
20	14 37 22.31	2.9752	20 48 53.4	10.646	20	16 33 0.37	2.4176	26 28 34.0	3.354
21	14 39 44.89	2.9773	20 59 28.1	10.508	21	16 35 25.39	2.4166	26 31 50.5	3.196
22	14 42 7.59	2.9794	21 9 54.4	10.368	22	16 37 50.36	2.4166	26 34 57.5	3.038
23	14 44 30.42	2.9816	21 20 12.3	10.228	23	16 40 15.26	2.4144	26 37 55.1	2.880
24	14 46 53.38	2.9837	S. 21 30 21.8	10.087	24	16 42 40.09	2.4132	S. 26 40 43.3	2.726



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 13.					THURSDAY 15.				
0	16 42 40.09	2.4133	S. 26 40 43.3	2.736	0	18 35 26.16	2.3267	S. 25 59 3.1	4.234
1	16 45 4.84	2.4118	26 43 23.1	2.569	1	18 37 43.54	2.3230	25 54 45.8	4.242
2	16 47 29.51	2.4104	26 45 51.6	2.413	2	18 39 58.62	2.3404	25 50 20.9	4.478
3	16 49 54.09	2.4089	26 48 11.7	2.257	3	18 42 13.44	2.3448	25 45 48.4	4.604
4	16 52 18.58	2.4073	26 50 22.5	2.102	4	18 44 27.95	2.3394	25 41 8.4	4.738
5	16 54 42.97	2.4058	26 52 23.9	1.946	5	18 46 42.17	2.3346	25 36 20.9	4.853
6	16 57 7.26	2.4038	26 54 15.9	1.791	6	18 48 56.09	2.3296	25 31 26.1	4.975
7	16 59 31.43	2.4020	26 55 58.7	1.636	7	18 51 9.79	2.3246	25 26 24.0	5.097
8	17 1 55.49	2.4000	26 57 32.2	1.482	8	18 53 23.05	2.3196	25 21 14.6	5.217
9	17 4 19.43	2.3980	26 58 56.4	1.327	9	18 55 36.08	2.3146	25 15 58.0	5.337
10	17 6 43.25	2.3959	27 0 11.4	1.174	10	18 57 48.81	2.3096	25 10 34.1	5.456
11	17 9 6.94	2.3937	27 1 17.2	1.020	11	19 0 1.23	2.3046	25 5 3.1	5.575
12	17 11 30.49	2.3915	27 2 13.7	0.867	12	19 2 13.35	2.1994	24 59 25.0	5.692
13	17 13 53.90	2.3890	27 3 1.1	0.714	13	19 4 25.16	2.1948	24 53 40.0	5.808
14	17 16 17.16	2.3864	27 3 39.4	0.562	14	19 6 36.67	2.1894	24 47 48.0	5.923
15	17 18 40.27	2.3839	27 4 8.6	0.410	15	19 8 47.87	2.1840	24 41 49.1	6.038
16	17 21 3.23	2.3813	27 4 28.8	0.260	16	19 10 58.76	2.1789	24 35 43.4	6.150
17	17 23 26.02	2.3788	27 4 39.9	0.109	17	19 13 9.34	2.1738	24 29 31.0	6.263
18	17 25 48.65	2.3767	27 4 41.9	0.041	18	19 15 10.61	2.1686	24 23 11.8	6.374
19	17 28 11.11	2.3738	27 4 35.0	0.190	19	19 17 29.57	2.1634	24 16 46.0	6.485
20	17 30 33.39	2.3698	27 4 19.1	0.388	20	19 19 39.22	2.1582	24 10 13.5	6.595
21	17 32 55.49	2.3668	27 3 54.3	0.487	21	19 21 48.56	2.1530	24 3 34.5	6.704
22	17 35 17.41	2.3637	27 3 30.7	0.634	22	19 23 57.58	2.1477	23 56 49.0	6.811
23	17 37 39.13	2.3604	S. 27 2 36.9	0.781	23	19 26 6.29	2.1426	S. 23 49 57.1	6.918
WEDNESDAY 14.					FRIDAY 16.				
0	17 40 0.66	2.3573	S. 27 1 47.0	0.987	0	19 28 14.68	2.1373	S. 23 42 58.8	7.024
1	17 42 21.99	2.3538	27 0 47.0	1.073	1	19 30 22.76	2.1321	23 35 54.2	7.132
2	17 44 43.12	2.3504	26 59 38.2	1.318	2	19 32 30.53	2.1269	23 28 43.3	7.244
3	17 47 4.04	2.3469	26 58 20.7	1.363	3	19 34 37.99	2.1216	23 21 26.2	7.357
4	17 49 24.75	2.3433	26 56 54.6	1.506	4	19 36 45.13	2.1164	23 14 2.9	7.470
5	17 51 45.24	2.3396	26 55 19.9	1.650	5	19 38 51.96	2.1112	23 6 33.5	7.584
6	17 54 5.50	2.3359	26 53 36.6	1.792	6	19 40 58.48	2.1060	22 58 58.1	7.697
7	17 56 25.54	2.3321	26 51 44.7	1.935	7	19 43 4.69	2.1008	22 51 16.7	7.810
8	17 58 45.35	2.3283	26 49 44.4	2.075	8	19 45 10.58	2.0956	22 43 29.3	7.923
9	18 1 4.93	2.3245	26 47 35.6	2.216	9	19 47 16.16	2.0904	22 35 36.1	8.036
10	18 3 24.27	2.3208	26 45 18.5	2.356	10	19 49 21.43	2.0852	22 27 37.0	8.149
11	18 5 43.37	2.3168	26 42 53.0	2.495	11	19 51 26.39	2.0802	22 19 32.2	8.262
12	18 8 2.92	2.3129	26 40 19.1	2.633	12	19 53 31.05	2.0751	22 11 21.7	8.375
13	18 10 20.83	2.3089	26 37 37.0	2.770	13	19 55 35.40	2.0699	22 3 5.6	8.488
14	18 12 39.18	2.3048	26 34 46.7	2.906	14	19 57 39.44	2.0648	21 54 43.9	8.601
15	18 14 57.28	2.2996	26 31 48.3	3.042	15	19 59 43.17	2.0597	21 46 16.6	8.714
16	18 17 15.12	2.2954	26 28 41.7	3.177	16	20 1 46.60	2.0547	21 37 43.9	8.827
17	18 19 32.70	2.2908	26 25 27.1	3.311	17	20 3 49.73	2.0496	21 29 5.8	8.940
18	18 21 50.01	2.2863	26 22 4.4	3.444	18	20 5 52.55	2.0446	21 20 22.3	9.053
19	18 24 7.06	2.2818	26 18 33.8	3.578	19	20 7 55.07	2.0394	21 11 33.5	9.166
20	18 26 23.83	2.2773	26 14 55.3	3.707	20	20 9 57.29	2.0344	21 2 39.4	9.279
21	18 28 40.33	2.2727	26 11 8.9	3.838	21	20 11 59.21	2.0293	20 53 40.2	9.392
22	18 30 56.55	2.2680	26 7 14.7	3.967	22	20 14 0.84	2.0247	20 44 35.8	9.505
23	18 33 12.49	2.2634	26 3 12.8	4.097	23	20 16 2.17	2.0196	20 35 26.3	9.618
24	18 35 28.16	2.2587	S. 25 59 3.1	4.224	24	20 18 3.21	2.0146	S. 20 26 11.8	9.731



## GREENWICH MEAN. TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 17.					MONDAY 19.				
0	h. m. s.	s.	S. O. ' "	"	0	h. m. s.	s.	S. O. ' "	"
0	20 18 3.21	2.0148	S. 20 26 11.8	9.384	0	21 49 51.75	1.8282	S. 11 41 3.1	12.279
1	20 20 3.95	2.0100	20 16 52.3	9.306	1	21 51 41.36	1.8255	11 28 45.1	12.332
2	20 22 4.41	2.0052	20 7 27.9	9.447	2	21 53 30.80	1.8229	11 16 24.5	12.363
3	20 24 4.58	2.0004	19 57 58.7	9.528	3	21 55 20.09	1.8203	11 4 1.5	12.404
4	20 26 4.46	1.9956	19 48 24.6	9.608	4	21 57 9.23	1.8178	10 51 36.0	12.444
5	20 28 4.06	1.9909	19 38 45.8	9.687	5	21 58 58.22	1.8153	10 39 8.1	12.481
6	20 30 3.37	1.9862	19 29 2.2	9.765	6	22 0 47.06	1.8129	10 26 37.9	12.522
7	20 32 2.40	1.9815	19 19 14.0	9.842	7	22 2 35.76	1.8106	10 14 5.4	12.561
8	20 34 1.16	1.9770	19 9 21.2	9.918	8	22 4 24.33	1.8083	10 1 30.6	12.598
9	20 35 59.64	1.9724	18 59 23.8	9.993	9	22 6 12.76	1.8061	9 48 53.6	12.635
10	20 37 57.84	1.9678	18 49 22.0	10.067	10	22 8 1.05	1.8039	9 36 14.4	12.671
11	20 39 55.77	1.9632	18 39 15.7	10.141	11	22 9 49.22	1.8018	9 23 33.1	12.706
12	20 41 53.43	1.9587	18 29 5.1	10.214	12	22 11 37.27	1.7998	9 10 49.7	12.740
13	20 43 50.82	1.9543	18 18 50.1	10.288	13	22 13 25.19	1.7977	8 58 4.3	12.774
14	20 45 47.95	1.9499	18 8 30.8	10.357	14	22 15 13.00	1.7956	8 45 16.8	12.807
15	20 47 44.81	1.9456	17 58 7.3	10.427	15	22 17 0.09	1.7939	8 32 27.4	12.839
16	20 49 41.42	1.9413	17 47 39.6	10.496	16	22 18 48.27	1.7922	8 19 36.1	12.870
17	20 51 37.77	1.9370	17 37 7.8	10.565	17	22 20 35.75	1.7904	8 6 43.0	12.901
18	20 53 33.86	1.9327	17 26 31.8	10.633	18	22 22 23.12	1.7887	7 53 48.0	12.931
19	20 55 29.70	1.9283	17 15 51.8	10.700	19	22 24 10.39	1.7870	7 40 51.2	12.961
20	20 57 25.29	1.9244	17 5 7.8	10.765	20	22 25 57.57	1.7855	7 27 52.7	12.989
21	20 59 20.63	1.9202	16 54 19.9	10.830	21	22 27 44.65	1.7839	7 14 52.5	13.017
22	21 1 15.72	1.9162	16 43 28.2	10.894	22	22 29 31.64	1.7825	7 1 50.7	13.044
23	21 3-10.57	1.9122	S. 16 32 32.6	10.958	23	22 31 18.55	1.7811	S. 6 48 47.3	13.070
SUNDAY 18.					TUESDAY 20.				
0	h. m. s.	s.	S. O. ' "	"	0	h. m. s.	s.	S. O. ' "	"
0	21 5 5.19	1.9088	S. 16 21 33.2	11.020	0	22 33 5.37	1.7797	S. 6 35 42.3	13.095
1	21 6 59.57	1.9043	16 10 30.2	11.082	1	22 34 52.12	1.7783	6 22 35.8	13.130
2	21 8 53.71	1.9003	15 59 23.4	11.143	2	22 36 38.79	1.7773	6 9 27.9	13.144
3	21 10 47.63	1.8967	15 48 13.0	11.203	3	22 38 25.39	1.7761	5 56 18.5	13.167
4	21 12 41.31	1.8929	15 36 59.1	11.262	4	22 40 11.92	1.7750	5 43 7.8	13.190
5	21 14 34.77	1.8891	15 25 41.6	11.320	5	22 41 58.39	1.7740	5 29 55.7	13.212
6	21 16 28.00	1.8854	15 14 20.7	11.377	6	22 43 44.80	1.7730	5 16 42.4	13.233
7	21 18 21.03	1.8818	15 2 56.3	11.435	7	22 45 31.15	1.7721	5 3 27.8	13.254
8	21 20 13.82	1.8782	14 51 28.5	11.491	8	22 47 17.45	1.7712	4 50 11.9	13.274
9	21 22 6.41	1.8747	14 39 57.4	11.546	9	22 49 3.70	1.7704	4 36 54.9	13.293
10	21 23 58.78	1.8712	14 28 23.0	11.600	10	22 50 49.90	1.7697	4 23 36.7	13.311
11	21 25 50.95	1.8678	14 16 45.3	11.654	11	22 52 36.06	1.7690	4 10 17.5	13.328
12	21 27 42.92	1.8644	14 5 4.5	11.708	12	22 54 22.18	1.7684	3 56 57.3	13.346
13	21 29 34.68	1.8611	13 53 20.5	11.763	13	22 56 8.27	1.7679	3 43 36.1	13.361
14	21 31 26.25	1.8578	13 41 33.5	11.809	14	22 57 54.32	1.7673	3 30 14.0	13.376
15	21 33 17.62	1.8546	13 29 43.4	11.850	15	22 59 40.35	1.7669	3 16 51.0	13.391
16	21 35 8.81	1.8515	13 17 50.3	11.900	16	23 1 26.35	1.7665	3 3 27.1	13.405
17	21 36 59.80	1.8484	13 5 54.2	11.938	17	23 3 12.33	1.7662	2 50 2.4	13.418
18	21 38 50.61	1.8454	12 53 55.3	12.006	18	23 4 58.30	1.7660	2 36 36.9	13.430
19	21 40 41.23	1.8423	12 41 53.5	12.053	19	23 6 44.26	1.7658	2 23 10.7	13.443
20	21 42 31.68	1.8392	12 29 48.9	12.100	20	23 8 30.20	1.7657	2 9 43.9	13.453
21	21 44 21.95	1.8364	12 17 41.5	12.146	21	23 10 16.14	1.7656	1 56 16.4	13.463
22	21 46 12.05	1.8336	12 5 31.4	12.191	22	23 12 2.07	1.7656	1 42 48.3	13.473
23	21 48 1.98	1.8309	11 53 18.6	12.236	23	23 13 48.01	1.7657	1 29 19.6	13.483
24	21 49 51.75	1.8282	S. 11 41 3.1	12.279	24	23 15 33.96	1.7658	S. 1 15 50.4	13.490



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 21.					FRIDAY 23.				
0	23 15 33.96	1.7658	S. 1 15 50.4	13.480	0	0 41 38.56	1.8444	N. 9 26 18.7	12.960
1	23 17 19.91	1.7660	1 2 20.8	13.498	1	0 43 29.32	1.8476	9 39 15.4	12.928
2	23 19 5.88	1.7663	0 48 50.7	13.504	2	0 45 20.26	1.8507	9 52 10.1	12.895
3	23 20 51.87	1.7666	0 35 20.3	13.509	3	0 47 11.40	1.8539	10 5 2.9	12.862
4	23 22 37.87	1.7670	0 21 49.6	13.514	4	0 49 2.73	1.8572	10 17 53.6	12.828
5	23 24 23.90	1.7674	S. 0 8 18.6	13.518	5	0 50 54.26	1.8606	10 30 42.3	12.794
6	23 26 9.96	1.7679	N. 0 5 12.6	13.521	6	0 52 46.01	1.8640	10 43 28.9	12.758
7	23 27 56.05	1.7684	0 18 44.0	13.524	7	0 54 37.95	1.8675	10 56 13.3	12.723
8	23 29 42.17	1.7690	0 32 15.5	13.526	8	0 56 30.11	1.8711	11 8 55.5	12.684
9	23 31 28.33	1.7697	0 45 47.1	13.527	9	0 58 22.48	1.8748	11 21 35.4	12.645
10	23 33 14.54	1.7704	0 59 18.8	13.527	10	1 0 15.08	1.8783	11 34 12.9	12.605
11	23 35 0.79	1.7712	1 12 50.5	13.527	11	1 2 7.89	1.8820	11 46 48.0	12.565
12	23 36 47.09	1.7721	1 26 22.1	13.526	12	1 4 0.92	1.8857	11 59 20.7	12.523
13	23 38 33.45	1.7730	1 39 53.7	13.525	13	1 5 54.18	1.8896	12 11 50.8	12.481
14	23 40 19.86	1.7740	1 53 25.1	13.523	14	1 7 47.67	1.8935	12 24 18.4	12.438
15	23 42 6.33	1.7751	2 6 56.4	13.520	15	1 9 41.40	1.8974	12 36 43.4	12.394
16	23 43 52.87	1.7762	2 20 27.5	13.516	16	1 11 35.37	1.9014	12 49 5.7	12.348
17	23 45 39.47	1.7774	2 33 58.3	13.511	17	1 13 29.57	1.9055	13 1 25.2	12.302
18	23 47 26.16	1.7786	2 47 28.8	13.505	18	1 15 24.02	1.9096	13 13 41.9	12.255
19	23 49 12.91	1.7799	3 0 50.0	13.499	19	1 17 18.72	1.9137	13 25 55.8	12.207
20	23 50 59.75	1.7813	3 14 28.7	13.491	20	1 19 13.67	1.9179	13 38 6.7	12.158
21	23 52 46.67	1.7828	3 27 58.0	13.483	21	1 21 8.87	1.9222	13 50 14.7	12.108
22	23 54 33.68	1.7843	3 41 26.7	13.474	22	1 23 4.33	1.9265	14 2 19.7	12.067
23	23 56 20.78	1.7859	N. 3 54 54.9	13.465	23	1 25 0.05	1.9308	N.14 14 21.6	12.006
THURSDAY 22.					SATURDAY 24.				
0	23 58 7.97	1.7876	N. 4 8 22.5	13.454	0	1 26 56.03	1.9352	N.14 26 20.4	11.982
1	23 59 55.26	1.7891	4 21 49.4	13.448	1	1 28 52.28	1.9397	14 38 15.9	11.938
2	0 1 42.65	1.7908	4 35 15.7	13.431	2	1 30 48.79	1.9442	14 50 8.2	11.893
3	0 3 30.15	1.7926	4 48 41.2	13.419	3	1 32 45.58	1.9488	15 1 57.1	11.847
4	0 5 17.75	1.7944	5 2 6.0	13.406	4	1 34 42.65	1.9534	15 13 42.6	11.799
5	0 7 5.47	1.7963	5 15 29.9	13.391	5	1 36 39.99	1.9581	15 25 24.7	11.752
6	0 8 53.31	1.7983	5 28 52.9	13.376	6	1 38 37.62	1.9628	15 37 3.2	11.613
7	0 10 41.27	1.8003	5 42 15.0	13.360	7	1 40 35.53	1.9676	15 48 38.2	11.562
8	0 12 29.35	1.8024	5 55 36.1	13.343	8	1 42 33.72	1.9723	16 0 9.5	11.490
9	0 14 17.56	1.8046	6 8 56.1	13.325	9	1 44 32.20	1.9772	16 11 37.1	11.426
10	0 16 5.90	1.8068	6 22 15.1	13.306	10	1 46 30.98	1.9822	16 23 0.9	11.366
11	0 17 54.38	1.8091	6 35 32.9	13.287	11	1 48 30.06	1.9871	16 34 20.9	11.304
12	0 19 42.99	1.8114	6 48 49.6	13.267	12	1 50 29.43	1.9921	16 45 37.1	11.236
13	0 21 31.75	1.8138	7 2 5.0	13.246	13	1 52 29.10	1.9971	16 56 49.3	11.169
14	0 23 20.65	1.8162	7 15 19.1	13.224	14	1 54 29.08	2.0022	17 7 57.4	11.101
15	0 25 9.70	1.8187	7 28 31.9	13.202	15	1 56 29.36	2.0072	17 19 1.5	11.033
16	0 26 58.92	1.8214	7 41 43.3	13.178	16	1 58 29.95	2.0124	17 30 1.4	10.963
17	0 28 48.29	1.8241	7 54 53.3	13.154	17	2 0 30.85	2.0176	17 40 57.1	10.893
18	0 30 37.81	1.8269	8 8 1.8	13.128	18	2 2 32.07	2.0229	17 51 48.6	10.821
19	0 32 27.50	1.8296	8 21 8.7	13.102	19	2 4 33.60	2.0281	18 2 35.7	10.748
20	0 34 17.38	1.8324	8 34 14.1	13.075	20	2 6 35.45	2.0334	18 13 18.4	10.674
21	0 36 7.39	1.8353	8 47 17.8	13.048	21	2 8 37.61	2.0386	18 23 56.6	10.599
22	0 37 57.60	1.8383	9 0 19.9	13.019	22	2 10 40.10	2.0442	18 34 30.3	10.523
23	0 39 47.99	1.8413	9 13 20.2	12.990	23	2 12 42.91	2.0496	18 44 59.4	10.446
24	0 41 38.56	1.8444	N. 9 26 18.7	12.959	24	2 14 46.05	2.0557	N.18 55 23.8	10.367



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 25.					TUESDAY 27.				
0	h. m. s.	"	° ' "	"	0	h. m. s.	"	° ' "	"
1	2 14 46.05	2.0861	N.18 55 23.8	10.267	1	3 59 59.08	2.2378	N.25 20 59.8	5.261
2	2 16 49.52	2.0866	19 5 43.4	10.268	2	4 2 18.87	2.2387	25 26 11.3	5.137
3	2 18 53.31	2.0880	19 15 58.3	10.268	3	4 4 38.99	2.2379	25 31 14.9	4.992
4	2 20 57.44	2.0716	19 26 8.3	10.136	4	4 6 59.42	2.2420	25 36 10.4	4.837
5	2 23 1.90	2.0771	19 36 13.4	10.043	5	4 9 20.15	2.2461	25 40 57.8	4.721
6	2 25 6.69	2.0827	19 46 13.4	9.920	6	4 11 41.19	2.2521	25 45 36.9	4.583
7	2 27 11.62	2.0888	19 56 8.4	9.874	7	4 14 2.52	2.2580	25 50 7.8	4.444
8	2 29 17.30	2.0940	20 5 58.2	9.787	8	4 16 24.15	2.2622	25 54 30.3	4.304
9	2 31 23.10	2.0996	20 15 42.8	9.669	9	4 18 46.07	2.2677	25 58 44.3	4.163
10	2 33 29.25	2.1068	20 25 22.1	9.510	10	4 21 8.27	2.2734	26 2 49.9	4.022
11	2 35 35.74	2.1110	20 34 56.0	9.320	11	4 23 30.76	2.2772	26 6 46.9	3.879
12	2 37 42.57	2.1167	20 44 24.5	9.129	12	4 25 53.53	2.2818	26 10 35.4	3.736
13	2 39 49.75	2.1226	20 53 47.6	8.937	13	4 28 16.57	2.2864	26 14 15.2	3.591
14	2 41 57.27	2.1288	21 3 5.1	8.744	14	4 30 39.88	2.2908	26 17 46.3	3.446
15	2 44 5.14	2.1341	21 12 16.9	8.550	15	4 33 3.46	2.2952	26 21 8.7	3.299
16	2 46 13.36	2.1399	21 21 23.1	8.356	16	4 35 27.30	2.2996	26 24 22.3	3.152
17	2 48 21.93	2.1467	21 30 23.5	8.169	17	4 37 51.40	2.3037	26 27 27.0	3.004
18	2 50 30.84	2.1516	21 39 18.1	7.980	18	4 40 15.75	2.3079	26 30 22.8	2.856
19	2 52 40.10	2.1573	21 48 6.7	7.781	19	4 42 40.34	2.3120	26 33 9.7	2.708
20	2 54 49.72	2.1631	21 56 49.4	7.581	20	4 45 5.18	2.3160	26 35 47.6	2.560
21	2 56 59.68	2.1689	22 5 26.0	7.380	21	4 47 30.26	2.3199	26 38 16.4	2.404
22	2 59 9.99	2.1747	22 13 56.5	7.177	22	4 49 55.57	2.3236	26 40 36.1	2.248
23	3 1 20.65	2.1806	22 22 20.9	6.983	23	4 52 21.10	2.3273	26 42 46.7	2.092
24	3 3 31.60	2.1865	N.22 30 39.0	6.789	24	4 54 46.85	2.3310	N.26 44 48.1	1.946
MONDAY 26.					WEDNESDAY 28.				
0	3 5 43.03	2.1924	N.22 38 50.8	6.593	0	4 57 12.82	2.3346	N.26 46 40.2	1.799
1	3 7 54.75	2.1992	22 46 56.2	6.398	1	4 59 39.00	2.3381	26 48 23.1	1.657
2	3 10 6.81	2.2040	22 54 55.2	7.207	2	5 2 5.38	2.3414	26 49 56.7	1.521
3	3 12 19.23	2.2099	23 2 47.6	7.018	3	5 4 31.97	2.3447	26 51 20.9	1.384
4	3 14 31.99	2.2158	23 10 33.4	7.797	4	5 6 58.75	2.3480	26 52 35.6	1.247
5	3 16 45.10	2.2216	23 18 12.6	7.596	5	5 9 25.71	2.3508	26 53 40.9	1.110
6	3 18 58.56	2.2278	23 25 45.0	7.393	6	5 11 52.66	2.3538	26 54 36.8	0.982
7	3 21 12.37	2.2330	23 33 10.6	7.189	7	5 14 20.18	2.3568	26 55 23.2	0.854
8	3 23 26.53	2.2386	23 40 29.3	7.384	8	5 16 47.68	2.3597	26 56 0.1	0.726
9	3 25 41.03	2.2446	23 47 41.1	7.188	9	5 19 15.34	2.3624	26 56 27.4	0.598
10	3 27 55.88	2.2506	23 54 45.9	7.023	10	5 21 43.16	2.3650	26 56 45.2	0.470
11	3 30 11.07	2.2560	24 1 43.6	6.802	11	5 24 11.12	2.3678	26 56 53.3	0.342
12	3 32 26.60	2.2617	24 8 34.2	6.782	12	5 26 39.23	2.3697	26 56 51.7	0.214
13	3 34 42.48	2.2674	24 15 17.5	6.602	13	5 29 7.48	2.3719	26 56 40.5	0.388
14	3 36 58.69	2.2731	24 21 53.6	6.540	14	5 31 35.86	2.3741	26 56 19.5	0.260
15	3 39 15.24	2.2787	24 28 22.4	6.417	15	5 34 4.37	2.3761	26 55 48.8	0.388
16	3 41 32.13	2.2843	24 34 43.7	6.298	16	5 36 33.00	2.3780	26 55 8.4	0.726
17	3 43 49.35	2.2898	24 40 57.5	6.167	17	5 39 1.74	2.3799	26 54 18.1	0.980
18	3 46 6.90	2.2953	24 47 3.8	6.041	18	5 41 30.59	2.3816	26 53 18.0	1.084
19	3 48 24.79	2.3008	24 53 2.5	5.914	19	5 43 59.53	2.3832	26 52 8.1	1.246
20	3 50 43.00	2.3062	24 58 53.5	5.788	20	5 46 28.57	2.3847	26 50 48.3	1.412
21	3 53 1.53	2.3116	25 4 36.8	5.657	21	5 48 57.69	2.3861	26 49 18.6	1.577
22	3 55 20.39	2.3170	25 10 12.3	5.526	22	5 51 26.90	2.3874	26 47 39.1	1.743
23	3 57 39.57	2.3223	25 15 39.9	5.394	23	5 53 56.18	2.3888	26 45 49.7	1.907
24	3 59 59.06	2.3278	N.25 20 59.6	5.261	24	5 56 25.53	2.3897	N.26 43 50.4	2.073



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 29.					SATURDAY 31.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	5 56 25.53	2.4987	N.26 43 50.4	2.072	0	7 55 15.63	2.4397	N.21 56 51.4	9.717
1	5 58 54.94	2.4986	26 41 41.1	2.327	1	7 57 41.31	2.4397	21 47 4.0	9.860
2	6 1 24.40	2.4915	26 39 21.9	2.402	2	8 0 6.82	2.4397	21 37 8.0	10.008
3	6 3 53.91	2.4922	26 36 52.8	2.467	3	8 2 32.15	2.4307	21 27 3.5	10.145
4	6 6 23.47	2.4929	26 34 13.8	2.732	4	8 4 57.30	2.4177	21 16 50.6	10.266
5	6 8 53.06	2.4984	26 31 24.8	2.806	5	8 7 22.27	2.4146	21 6 29.2	10.425
6	6 11 22.68	2.4988	26 28 26.0	3.064	6	8 9 47.04	2.4115	20 55 59.5	10.603
7	6 13 52.32	2.4941	26 25 17.2	3.230	7	8 12 11.63	2.4064	20 45 21.5	10.700
8	6 16 21.97	2.4943	26 21 58.6	3.395	8	8 14 36.03	2.4052	20 34 35.3	10.837
9	6 18 51.63	2.4944	26 18 30.0	3.561	9	8 17 0.23	2.4030	20 23 41.0	10.973
10	6 21 21.30	2.4944	26 14 51.5	3.726	10	8 19 24.25	2.3999	20 12 38.5	11.108
11	6 23 50.96	2.4943	26 11 3.0	3.892	11	8 21 48.08	2.3956	20 1 28.0	11.241
12	6 26 20.62	2.4941	26 7 4.6	4.057	12	8 24 11.71	2.3923	19 50 9.7	11.373
13	6 28 50.26	2.4938	26 2 56.2	4.222	13	8 26 35.14	2.3890	19 38 43.4	11.503
14	6 31 19.88	2.4934	25 58 38.0	4.387	14	8 28 58.38	2.3858	19 27 9.3	11.632
15	6 33 49.47	2.4929	25 54 9.8	4.552	15	8 31 21.43	2.3826	19 15 27.6	11.760
16	6 36 19.02	2.4923	25 49 31.7	4.717	16	8 33 44.28	2.3793	19 3 38.2	11.887
17	6 38 48.53	2.4916	25 44 43.8	4.881	17	8 36 6.93	2.3760	18 51 41.2	12.013
18	6 41 18.00	2.4906	25 39 46.0	5.045	18	8 38 29.39	2.3727	18 39 36.7	12.138
19	6 43 47.41	2.4897	25 34 38.4	5.209	19	8 40 51.65	2.3694	18 27 24.8	12.261
20	6 46 16.77	2.4886	25 29 21.0	5.371	20	8 43 13.72	2.3661	18 15 5.5	12.383
21	6 48 46.07	2.4877	25 23 53.8	5.534	21	8 45 35.59	2.3628	18 2 39.0	12.503
22	6 51 15.30	2.4865	25 18 16.8	5.697	22	8 47 57.26	2.3595	17 50 5.3	12.622
23	6 53 44.46	2.4852	N.25 12 30.1	5.860	23	8 50 18.73	2.3562	N.17 37 24.5	12.740
FRIDAY 30.					SUNDAY, APRIL 1.				
0	6 56 13.53	2.4838	N.25 6 33.7	6.021	0	8 52 40.01	2.3529	N.17 24 36.7	12.857
1	6 58 42.52	2.4834	25 0 27.6	6.183	PHASES OF THE MOON.				
2	7 1 11.42	2.4830	24 54 11.8	6.344					
3	7 3 40.22	2.4792	24 47 46.4	6.504					
4	7 6 8.93	2.4775	24 41 11.4	6.664					
5	7 8 37.53	2.4758	24 34 26.8	6.823	<div> <div>Day. h. m.</div> <div>○ Full Moon, . . . 7 0 44.2</div> <div>☾ Last Quarter, . . . 13 21 8.7</div> <div>● New Moon, . . . 22 1 55.5</div> <div>☾ First Quarter, . . . 29 18 52.8</div> </div>				
6	7 11 6.03	2.4739	24 27 32.6	7.082					
7	7 13 34.41	2.4720	24 20 28.9	7.141					
8	7 16 2.67	2.4700	24 13 15.7	7.298					
9	7 18 30.81	2.4680	24 5 53.1	7.455	<div> <div>Day. h.</div> <div>☾ Perigee, . . . . . 6 16.1</div> <div>☾ Apogee, . . . . . 19 13.1</div> </div>				
10	7 20 58.83	2.4659	23 58 21.1	7.611					
11	7 23 26.71	2.4636	23 50 39.7	7.767					
12	7 25 54.46	2.4613	23 42 49.0	7.922					
13	7 28 22.07	2.4589	23 34 49.1	8.076					
14	7 30 49.53	2.4565	23 26 39.9	8.229					
15	7 33 16.85	2.4541	23 18 21.5	8.382					
16	7 35 44.02	2.4516	23 9 54.0	8.534					
17	7 38 11.04	2.4490	23 1 17.4	8.686					
18	7 40 37.90	2.4464	22 52 31.8	8.838					
19	7 43 4.60	2.4437	22 43 37.2	8.986					
20	7 45 31.14	2.4410	22 34 33.6	9.133					
21	7 47 57.51	2.4382	22 25 21.2	9.280					
22	7 50 23.72	2.4354	22 16 0.0	9.427					
23	7 52 49.75	2.4325	22 6 30.0	9.573					
24	7 55 15.62	2.4296	N.21 56 51.4	9.717					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
			° ' "		° ' "		° ' "		° ' "	
1	SUN	W.	98 12 40	2861	99 45 49	2842	101 19 23	2823	102 53 21	2806
	Venus	W.	61 58 23	2849	63 29 40	2829	65 1 32	2809	66 33 30	2800
	α Arietis	W.	43 43 53	2661	45 23 56	2631	47 4 26	2519	48 45 22	2484
	Jupiter	E.	26 10 45	2522	24 30 3	2607	22 48 59	2492	21 7 34	2477
	Saturn	E.	61 46 22	2500	60 5 9	2484	58 23 33	2467	56 41 33	2450
	Regulus	E.	68 30 37	2623	66 49 56	2506	65 8 51	2489	63 27 22	2471
2	SUN	W.	110 49 19	2710	112 25 47	2690	114 2 40	2673	115 39 58	2654
	Venus	W.	74 20 27	2790	75 55 8	2771	77 30 14	2750	79 5 47	2732
	α Arietis	W.	57 16 40	2399	59 0 16	2381	60 44 18	2363	62 28 46	2345
	Aldebaran	W.	26 37 15	2721	28 13 27	2697	29 50 51	2618	31 29 21	2574
	Saturn	E.	48 5 27	2363	46 20 59	2346	44 36 6	2328	42 50 48	2311
	Regulus	E.	54 53 42	2363	53 9 43	2368	51 25 18	2348	49 40 28	2331
3	SUN	W.	123 52 43	2562	125 32 30	2545	127 12 41	2527	128 53 16	2511
	Venus	W.	87 9 56	2636	88 48 2	2618	90 26 33	2599	92 5 29	2582
	α Arietis	W.	71 17 40	2256	73 4 44	2239	74 52 14	2222	76 40 9	2206
	Aldebaran	W.	39 55 26	2403	41 38 57	2376	43 23 8	2349	45 7 56	2334
	Saturn	E.	33 58 11	2230	32 10 28	2215	30 22 23	2200	28 33 56	2186
	Regulus	E.	40 50 2	2246	39 2 43	2229	37 14 59	2214	35 26 52	2198
4	Venus	W.	100 26 0	2500	102 7 13	2485	103 48 47	2471	105 30 41	2458
	α Arietis	W.	85 45 36	2131	87 35 48	2116	89 26 22	2103	91 17 17	2090
	Aldebaran	W.	54 0 27	2218	55 48 28	2199	57 36 57	2183	59 25 51	2166
	Jupiter	W.	16 17 2	2135	18 7 8	2116	19 57 42	2100	21 48 41	2085
	Spica	E.	80 23 11	2120	78 32 43	2107	76 41 55	2094	74 50 47	2081
5	Aldebaran	W.	68 36 5	2098	70 27 8	2087	72 18 27	2077	74 10 2	2068
	Jupiter	W.	31 9 0	2023	33 1 58	2014	34 55 11	2005	36 48 38	1996
	Pollux	W.	26 3 4	2099	27 54 4	2081	29 45 33	2065	31 37 26	2051
	Spica	E.	65 30 31	2027	63 37 39	2018	61 44 33	2010	59 51 14	2008
	Antares	E.	111 18 43	2020	109 25 40	2011	107 32 23	2008	105 38 53	1996
6	Aldebaran	W.	83 30 59	2086	85 23 37	2082	87 16 21	2080	89 9 6	2098
	Jupiter	W.	46 18 44	1998	48 13 9	1986	50 7 39	1982	52 2 13	1980
	Pollux	W.	41 1 31	2004	42 54 59	1993	44 48 37	1993	46 42 22	1990
	Spica	E.	50 22 9	1977	48 27 58	1976	46 33 44	1973	44 39 27	1973
	Antares	E.	96 8 45	1968	94 14 20	1964	92 19 49	1962	90 25 15	1960
	Mars	E.	109 12 38	2147	107 22 50	2143	105 32 57	2141	103 43 0	2138
7	Jupiter	W.	61 35 19	1984	63 29 50	1987	65 24 16	1972	67 18 35	1976
	Pollux	W.	56 11 56	1987	58 5 51	1990	59 59 41	1998	61 53 27	1997
	Saturn	W.	26 20 0	1963	28 14 33	1964	30 9 4	1966	32 3 32	1970
	Spica	E.	35 8 10	1982	33 14 7	1987	31 20 12	1998	29 26 27	2001
	Antares	E.	80 52 11	1965	78 57 41	1968	77 3 16	1973	75 8 58	1977
	Mars	E.	94 32 51	2141	92 42 54	2145	90 53 3	2148	89 3 18	2138
8	Jupiter	W.	76 47 51	2012	78 41 6	2022	80 34 6	2032	82 26 51	2043
	Pollux	W.	71 20 11	2030	73 12 58	2039	75 5 31	2049	76 57 49	2059
	Saturn	W.	41 33 57	2001	43 27 29	2010	45 20 48	2019	47 13 52	2030
	Regulus	W.	34 19 20	2020	36 12 23	2029	38 5 12	2039	39 57 46	2048
	Antares	E.	65 39 43	2012	63 46 28	2022	61 53 28	2032	60 0 44	2042
	Mars	E.	79 56 47	2190	78 8 5	2200	76 19 37	2210	74 31 25	2221
9	Jupiter	W.	91 46 0	2107	93 36 49	2120	95 27 17	2136	97 17 22	2151



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
1	SUN W.	104 27 43	2788	106 2 29	2767	107 37 40	2747	109 13 17	2729
	Venus W.	68 6 2	2680	69 39 0	2660	71 12 23	2630	72 46 12	2610
	α Arietis W.	50 26 44	2475	52 8 33	2455	53 50 49	2437	55 33 31	2418
	Jupiter E.	19 25 49	2464	17 43 45	2461	16 1 23	2439	14 18 44	2428
	Saturn E.	54 59 10	2432	53 16 21	2416	51 33 8	2398	49 49 30	2380
	Regulus E.	61 45 28	2433	60 3 9	2436	58 20 25	2418	56 37 16	2401
2	SUN W.	117 17 40	2684	118 55 49	2616	120 34 22	2568	122 13 20	2680
	Venus W.	80 41 45	2711	82 18 10	2692	83 55 0	2674	85 32 15	2655
	α Arietis W.	64 13 40	2236	65 59 1	2208	67 44 49	2191	69 31 2	2274
	Aldebaran W.	33 8 52	2294	34 49 18	2496	36 30 34	2464	38 12 38	2433
	Saturn E.	41 5 5	2294	39 18 57	2279	37 32 26	2263	35 45 31	2245
	Regulus E.	47 55 13	2212	46 9 32	2296	44 23 20	2279	42 36 56	2263
3	SUN W.	130 34 14	2494	132 15 35	2478	133 57 19	2462	135 39 25	2448
	Venus W.	93 44 49	2666	95 24 32	2648	97 4 39	2632	98 45 8	2616
	α Arietis W.	78 28 28	2190	80 17 10	2174	82 6 16	2160	83 55 45	2145
	Aldebaran W.	46 53 20	2200	48 39 19	2278	50 25 51	2257	52 12 54	2227
	Saturn E.	26 45 7	2173	24 55 58	2161	23 6 31	2147	21 16 46	2135
	Regulus E.	33 38 22	2184	31 49 30	2169	30 0 16	2155	28 10 40	2141
4	Venus W.	107 12 54	2444	108 55 26	2432	110 38 15	2420	112 21 21	2410
	α Arietis W.	93 8 31	2078	95 0 4	2068	96 51 55	2046	98 44 2	2046
	Aldebaran W.	61 15 10	2160	63 4 53	2136	64 54 57	2128	66 45 21	2110
	Jupiter W.	23 40 4	2070	25 31 49	2057	27 23 54	2046	29 16 18	2033
	Spica E.	72 59 19	2070	71 7 33	2068	69 15 29	2047	67 23 8	2037
5	Aldebaran W.	76 1 51	2069	77 53 53	2052	79 46 6	2046	81 38 29	2041
	Jupiter W.	38 42 18	1989	40 36 10	1982	42 30 13	1976	44 24 25	1972
	Pollux W.	33 29 41	2008	35 23 16	2028	37 15 7	2018	39 8 13	2010
	Spica E.	57 57 44	1996	56 4 3	1990	54 10 13	1984	52 16 14	1981
	Antares E.	103 45 11	1998	101 51 18	1992	99 57 15	1977	98 3 4	1972
6	Aldebaran W.	91 1 58	2027	92 54 50	2028	94 47 41	2020	96 40 29	2021
	Jupiter W.	53 56 50	1969	55 51 29	1980	57 46 7	1960	59 40 44	1962
	Pollux W.	48 36 12	1967	50 30 6	1966	52 24 3	1966	54 18 0	1966
	Spica E.	42 45 8	1972	40 50 49	1972	38 56 32	1975	37 2 19	1978
	Antares E.	88 30 38	1980	86 36 0	1980	84 41 22	1980	82 46 45	1982
	Mars E.	101 52 59	2127	100 2 56	2127	98 12 53	2127	96 22 51	2120
7	Jupiter W.	69 12 47	1992	71 6 50	1989	73 0 42	1996	74 54 23	2004
	Pollux W.	63 45 7	2001	65 40 37	2008	67 33 59	2014	69 27 11	2022
	Saturn W.	33 57 54	1974	35 52 9	1980	37 46 15	1986	39 40 12	1993
	Spica E.	27 32 54	2010	25 39 35	2020	23 46 32	2022	21 53 48	2046
	Antares E.	73 14 47	1992	71 20 45	1989	69 26 53	1996	67 33 12	2003
	Mars E.	87 13 40	2129	85 24 10	2166	83 34 51	2173	81 45 43	2181
8	Jupiter W.	84 19 18	2064	86 11 28	2086	88 3 19	2080	89 54 49	2092
	Pollux W.	78 49 50	2071	80 41 34	2083	82 33 0	2093	84 24 7	2108
	Saturn W.	49 6 39	2041	50 59 9	2063	52 51 21	2066	54 43 14	2078
	Regulus W.	41 50 5	2080	43 42 6	2072	45 33 49	2084	47 25 13	2097
	Antares E.	58 8 16	2064	56 16 6	2066	54 24 15	2079	52 32 43	2092
	Mars E.	72 43 29	2223	70 55 52	2246	69 8 33	2260	67 21 35	2273
9	Jupiter W.	99 7 3	2167	100 56 20	2184	102 45 12	2200	104 33 39	2218



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
9	Pollux W.	86 14 54	2122	88 5 19	2126	89 55 23	2151	91 45 5	2167
	Saturn W.	56 34 47	2092	58 25 59	2106	60 16 50	2130	62 7 18	2136
	Regulus W.	49 16 17	2110	51 7 1	2124	52 57 23	2139	54 47 23	2154
	Antares E.	50 41 31	2106	48 50 40	2130	47 0 11	2135	45 10 5	2150
	Mars E.	65 34 56	2298	63 48 39	2304	62 2 45	2320	60 17 14	2336
	$\alpha$ Aquilæ E.	103 31 35	2774	101 56 33	2780	100 21 39	2787	98 46 54	2796
10	Jupiter W.	106 21 40	2225	108 9 15	2259	109 56 24	2270	111 43 7	2289
	Pollux W.	100 47 30	2260	102 34 43	2269	104 21 30	2286	106 7 50	2304
	Saturn W.	71 13 41	2218	73 1 42	2226	74 49 18	2253	76 36 27	2271
	Regulus W.	63 51 25	2226	65 38 59	2254	67 26 6	2272	69 12 47	2289
	Antares E.	36 5 38	2224	34 18 1	2251	32 30 49	2268	30 44 3	2296
	Mars E.	51 35 44	2424	49 52 43	2442	48 10 10	2462	46 28 4	2482
11	$\alpha$ Aquilæ E.	90 56 43	2663	89 23 37	2682	87 50 55	2701	86 18 37	2722
	Saturn W.	85 25 28	2664	87 9 55	2683	88 53 54	2702	90 37 26	2721
	Regulus W.	77 59 31	2692	79 43 31	2702	81 27 3	2721	83 10 8	2740
	Spica W.	24 2 41	2410	25 46 7	2426	27 29 4	2443	29 11 38	2459
	Mars E.	38 4 40	2667	36 25 27	2698	34 46 43	2731	33 8 30	2752
	$\alpha$ Aquilæ E.	78 44 12	2743	77 14 53	2772	75 46 9	2801	74 18 1	2822
12	SUN E.	125 12 37	2714	123 36 16	2726	122 0 22	2754	120 24 54	2775
	Saturn W.	99 8 21	2616	100 49 12	2635	102 29 37	2653	104 9 37	2672
	Regulus W.	91 38 49	2635	93 19 13	2653	94 59 12	2672	96 38 46	2691
	Spica W.	37 38 30	2646	39 18 39	2664	40 58 23	2683	42 37 42	2699
	$\alpha$ Aquilæ E.	67 7 6	2306	65 43 1	2345	64 19 41	2386	62 57 9	2429
	SUN E.	112 34 14	2676	111 1 25	2696	109 29 1	2716	107 57 2	2736
13	Regulus W.	104 50 19	2690	106 27 26	2696	108 4 11	2713	109 40 33	2730
	Spica W.	50 48 25	2686	52 25 24	2702	54 2 1	2719	55 38 16	2735
	$\alpha$ Aquilæ E.	56 17 16	2678	55 0 6	2736	53 43 57	2797	52 28 52	2861
	SUN E.	100 23 21	2692	98 53 48	2701	97 24 38	2709	95 55 50	2707
14	Spica W.	63 34 18	2611	65 8 31	2626	66 42 26	2639	68 16 3	2653
	Antares W.	17 42 8	2606	19 16 30	2619	20 50 33	2633	22 24 18	2647
	SUN E.	88 37 10	3171	87 10 26	3167	85 44 1	3202	84 17 54	3217
15	Spica W.	75 59 55	2915	77 31 55	2927	79 3 40	2937	80 35 12	2948
	Antares W.	30 8 48	2909	31 40 55	2920	33 12 48	2932	34 44 26	2942
	SUN E.	77 11 37	3286	75 47 9	3299	74 22 56	3310	72 58 56	3322
16	Spica W.	88 9 43	2993	89 40 4	3001	91 10 15	3009	92 40 16	3017
	Antares W.	42 19 32	2998	43 50 0	2997	45 20 17	3004	46 50 25	3011
	Mars W.	23 50 47	3248	25 15 59	3260	26 41 9	3268	28 6 15	3277
	SUN E.	66 2 10	3274	64 39 24	3283	63 16 48	3292	61 54 22	3300
17	Spica W.	100 8 16	3047	101 37 30	3052	103 6 38	3066	104 35 41	3061
	Antares W.	54 18 59	3042	55 48 20	3047	57 17 35	3051	58 46 45	3055
	Mars W.	35 10 43	3275	36 35 24	3278	38 0 1	3281	39 24 35	3284
	SUN E.	55 4 23	3426	53 42 46	3441	52 21 16	3447	50 59 53	3462
18	Antares W.	66 11 26	3071	67 40 11	3073	69 8 54	3074	70 37 35	3077
	Mars W.	46 26 39	3294	47 50 57	3296	49 15 14	3296	50 39 30	3298
	SUN E.	44 14 16	3475	42 53 24	3477	41 32 34	3480	40 11 48	3483



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of DIST.	XVh.	P. L. of DIST.	XVIIIh.	P. L. of DIST.	XXIh.	P. L. of DIST.
		° ' "		° ' "		° ' "		° ' "	
9	Pollux W.	93 34 23	2192	95 23 17	2196	97 11 47	2215	98 59 52	2228
	Saturn W.	63 57 23	2181	65 47 4	2187	67 36 21	2183	69 25 14	2200
	Regulus W.	56 37 0	2170	58 26 13	2166	60 15 2	2202	62 3 26	2219
	Antares E.	43 20 22	2167	41 31 4	2162	39 42 10	2199	37 53 41	2216
	Mars E.	58 32 6	2263	56 47 23	2268	55 3 4	2267	53 19 10	2406
	α Aquilæ E.	97 12 20	2206	95 38 0	2218	94 3 56	2232	92 30 10	2247
10	Jupiter W.	113 29 23	2307	115 15 12	2326	117 0 33	2345	118 45 27	2364
	Pollux W.	107 53 43	2223	109 39 9	2242	111 24 7	2261	113 8 38	2281
	Saturn W.	78 23 9	2229	80 9 24	2207	81 55 13	2226	83 40 34	2245
	Regulus W.	70 59 2	2208	72 44 50	2225	74 30 11	2246	76 15 4	2264
	Antares E.	28 57 43	2204	27 11 49	2221	25 26 20	2239	23 41 17	2256
	Mars E.	44 46 26	2208	43 5 17	2223	41 24 35	2244	39 44 23	2265
	α Aquilæ E.	84 46 46	2242	83 15 22	2267	81 44 28	2291	80 14 4	2317
11	Saturn W.	92 20 31	2440	94 3 9	2459	95 45 20	2479	97 27 4	2497
	Regulus W.	84 52 46	2460	86 34 56	2478	88 16 40	2497	89 57 58	2516
	Spica W.	30 53 49	2476	32 35 36	2494	34 16 58	2511	35 57 56	2528
	Mars E.	31 30 46	2277	29 53 35	2299	28 16 54	2734	26 40 46	2750
	α Aquilæ E.	72 50 30	3164	71 23 38	3197	69 57 25	3223	68 31 55	3268
	SUN E.	118 49 53	2795	117 15 19	2816	115 41 11	2835	114 7 20	2866
12	Saturn W.	105 49 11	2690	107 28 20	2708	109 7 4	2726	110 45 24	2743
	Regulus W.	98 17 54	2610	99 56 36	2627	101 34 54	2645	103 12 48	2662
	Spica W.	44 16 38	2617	45 55 10	2635	47 33 18	2652	49 11 3	2669
	α Aquilæ E.	61 35 25	3274	60 14 32	3291	58 54 31	3271	57 35 25	3292
	SUN E.	106 25 29	2966	104 54 21	2975	103 23 37	2994	101 53 17	3014
13	Regulus W.	111 16 33	2746	112 52 19	2768	114 27 29	2779	116 2 25	2794
	Spica W.	57 14 9	2780	58 49 42	2768	60 24 54	2782	61 59 46	2797
	α Aquilæ E.	51 14 53	3229	50 2 3	4008	48 50 26	4088	47 40 8	4171
	SUN E.	94 27 24	3106	92 59 20	3122	91 31 37	3138	90 4 13	3155
14	Spica W.	69 49 22	2866	71 22 24	2879	73 55 11	2891	74 27 40	2908
	Antares W.	23 57 45	2960	25 30 55	2973	27 3 48	2986	28 36 26	2998
	SUN E.	82 52 5	3222	81 26 34	3246	80 1 19	3259	78 36 20	3273
15	Spica W.	82 6 30	2968	83 37 36	2987	85 8 30	2977	86 39 12	2985
	Antares W.	36 15 52	2962	37 47 5	2992	39 18 5	2971	40 48 54	2980
	SUN E.	71 35 10	3232	70 11 37	3244	68 48 16	3255	67 25 8	3264
16	Spica W.	94 10 8	3022	95 39 52	3030	97 9 27	3038	98 38 56	3042
	Antares W.	48 20 24	3018	49 50 14	3025	51 19 56	3030	52 49 31	3036
	Mars W.	29 31 17	3290	30 56 15	3265	32 21 8	3267	33 45 58	3271
	SUN E.	60 32 5	3408	59 9 57	3416	57 47 58	3423	56 26 7	3429
17	Spica W.	106 4 38	3065	107 33 31	3069	109 2 19	3071	110 31 4	3074
	Antares W.	60 15 50	3069	61 44 50	3082	63 13 46	3065	64 42 38	3069
	Mars W.	40 49 5	3287	42 13 32	3298	43 37 57	3291	45 2 19	3293
	SUN E.	49 38 35	3458	48 17 24	3462	46 56 17	3465	45 35 14	3470
18	Antares W.	72 6 13	3078	73 34 50	3078	75 3 26	3079	76 32 1	3079
	Mars W.	52 3 44	3299	53 27 57	3299	54 52 10	3298	56 16 24	3299
	SUN E.	38 51 5	3487	37 30 26	3489	36 9 50	3492	34 49 17	3495



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VTh.	P. L. of Dist.	IXh.	P. L. of Dist.
19	Antares W.	78 0 36	3079	79 29 11	3079	80 57 46	3078	82 26 23	3078
	Mars W.	57 40 37	3299	59 4 50	3297	60 29 5	3295	61 53 22	3296
	SUN E.	33 28 47	3497	39 8 20	3499	30 47 55	3603	29 27 34	3506
24	SUN W.	21 54 17	3370	23 17 8	3385	24 40 16	3341	26 3 40	3327
	Aldebaran E.	43 35 1	3073	49 6 18	3076	40 37 39	3078	39 9 3	3068
	Jupiter E.	80 2 13	2946	78 30 52	2939	76 59 23	2933	75 27 46	2926
	Pollux E.	85 18 21	2946	83 47 0	2939	82 15 31	2933	80 43 54	2926
25	SUN W.	33 4 17	3370	34 29 4	3385	35 54 4	3347	37 19 17	3326
	Aldebaran E.	31 48 1	3130	30 20 28	3147	28 53 15	3106	27 26 27	3103
	Jupiter E.	67 47 25	2990	66 14 53	2992	64 42 11	2974	63 9 19	2966
	Pollux E.	73 3 33	2990	71 31 1	2993	69 58 20	2976	68 25 30	2967
	Saturn E.	101 46 46	2990	100 13 36	2992	98 40 16	2944	97 6 45	2936
	Regulus E.	109 58 11	2974	108 25 19	2967	106 52 18	2959	105 19 6	2951
26	SUN W.	44 28 32	3183	45 55 2	3173	47 21 44	3161	48 48 40	3160
	Jupiter E.	55 29 23	2934	53 48 25	2915	52 14 17	2906	50 39 57	2797
	Pollux E.	60 38 45	2928	59 4 53	2920	57 30 50	2911	55 56 37	2901
	Saturn E.	89 16 31	2794	87 41 55	2785	86 7 7	2775	84 32 6	2766
	Regulus E.	97 30 25	2907	95 56 6	2798	94 21 36	2789	92 46 54	2780
27	SUN W.	56 6 41	3092	57 35 0	3081	59 3 33	3069	60 32 21	3068
	Jupiter E.	42 45 12	2747	41 9 35	2738	39 33 45	2728	37 57 42	2716
	Pollux E.	48 2 37	2786	46 27 14	2780	44 51 40	2741	43 15 54	2732
	Saturn E.	76 33 56	2716	74 57 38	2706	73 21 6	2695	71 44 20	2685
	Regulus E.	84 50 12	2729	83 14 11	2719	81 37 56	2709	80 1 28	2697
28	SUN W.	68 0 15	2992	69 30 38	2979	71 1 17	2965	72 32 13	2953
	Venus W.	26 46 58	3078	28 15 35	3090	29 44 33	3043	31 13 53	3026
	Jupiter E.	29 53 49	2992	28 16 18	2961	26 38 32	2939	25 0 30	2926
	Pollux E.	35 14 14	2990	33 37 21	2984	32 0 19	2977	30 23 8	2971
	Saturn E.	63 36 48	2928	61 58 31	2916	60 19 58	2904	58 41 8	2892
	Regulus E.	71 55 17	2939	70 17 15	2926	68 38 58	2915	67 0 24	2908
29	SUN W.	80 11 17	2992	81 43 59	2987	83 17 0	2972	84 50 20	2957
	Venus W.	38 45 39	2945	40 17 1	2929	41 48 43	2913	43 20 45	2897
	Aldebaran W.	23 3 50	2973	24 34 37	2906	26 6 46	2950	27 40 9	2901
	Saturn E.	50 23 47	2929	48 42 14	2916	47 1 23	2904	45 20 15	2890
	Regulus E.	58 43 16	2939	57 3 57	2926	55 22 20	2912	53 41 24	2899
	Spica E.	112 46 19	2942	111 6 4	2937	109 25 29	2915	107 44 36	2900
30	SUN W.	92 41 40	2763	94 17 6	2748	95 53 42	2733	97 28 38	2717
	Venus W.	51 6 7	2916	52 40 14	2901	54 14 41	2784	55 49 30	2768
	Aldebaran W.	35 41 18	2916	37 19 51	2898	38 59 3	2861	40 38 52	2836
	Saturn E.	36 49 54	2424	35 6 54	2411	33 23 35	2398	31 39 57	2386
	Regulus E.	45 12 1	2431	43 29 11	2417	41 46 1	2404	40 2 32	2391
	Spica E.	99 15 16	2431	97 32 25	2417	95 49 14	2403	94 5 43	2389
31	SUN W.	105 33 22	2643	107 11 19	2629	108 49 35	2615	110 28 10	2600
	Venus W.	63 48 50	2938	65 25 46	2973	67 3 2	2958	68 40 38	2943
	Aldebaran W.	49 6 9	2436	50 49 7	2407	52 32 32	2398	54 16 24	2371
	Regulus E.	31 20 17	2334	29 34 53	2312	27 49 11	2299	26 3 10	2286
	Spica E.	85 23 2	2318	83 37 29	2304	81 51 35	2291	80 5 22	2277



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>	
19	Antares W.	83 54 58	3077	85 23 36	3076	86 52 15	3074	88 20 56	3073
	Mars W.	63 17 39	3294	64 41 57	3292	66 6 18	3289	67 30 42	3288
	SUN E.	26 7 17	3509	26 47 2	3512	25 26 52	3516	24 6 46	3520
24	SUN W.	27 27 20	3315	28 51 14	3308	30 15 22	3292	31 39 43	3281
	Aldebaran E.	37 40 33	3069	36 12 10	3066	34 43 56	3106	33 15 52	3115
	Jupiter E.	73 56 0	3019	72 24 5	2912	70 52 1	2905	69 19 48	2897
	Pollux E.	79 12 7	2918	77 40 11	2912	76 8 8	2906	74 35 56	2897
25	SUN W.	36 44 43	3226	40 10 21	3216	41 36 11	3204	43 2 15	3192
	Aldebaran E.	26 0 10	3226	24 34 32	3267	23 9 42	3219	21 45 52	3206
	Jupiter E.	61 36 17	2956	60 3 4	2950	58 29 41	2942	56 56 7	2933
	Pollux E.	66 52 29	2950	65 19 18	2952	63 45 57	2944	62 12 26	2936
	Saturn E.	95 33 4	2929	93 59 12	2919	92 25 9	2911	90 50 56	2902
	Regulus E.	103 45 44	2942	102 12 12	2934	100 38 28	2924	99 4 32	2918
26	SUN W.	50 15 49	3129	51 43 11	3129	53 10 46	3116	54 38 36	3104
	Jupiter E.	49 5 25	2798	47 30 41	2778	45 55 44	2769	44 20 35	2766
	Pollux E.	54 22 11	2792	52 47 34	2786	51 12 46	2777	49 37 48	2767
	Saturn E.	82 56 54	2756	81 21 29	2747	79 45 51	2737	78 10 0	2727
	Regulus E.	91 12 0	2760	89 36 52	2760	88 1 31	2760	86 25 58	2741
27	SUN W.	62 1 25	3042	63 30 44	3021	65 0 18	3018	66 30 8	3006
	Jupiter E.	36 21 24	2708	34 44 52	2696	33 8 6	2684	31 31 5	2673
	Pollux E.	41 39 57	2728	40 3 48	2714	38 27 27	2707	36 50 50	2696
	Saturn E.	70 7 20	2674	68 30 5	2663	66 52 35	2651	65 14 49	2640
	Regulus E.	78 24 44	2686	76 47 45	2676	75 10 31	2663	73 33 2	2652
28	SUN W.	74 3 26	2928	75 34 57	2924	77 6 46	2909	78 38 53	2896
	Venus W.	32 43 34	3000	34 13 35	2998	35 43 56	2977	37 14 37	2961
	Jupiter E.	23 22 13	2617	21 43 41	2607	20 4 55	2596	18 25 54	2585
	Pollux E.	28 45 49	2606	27 8 23	2593	25 30 53	2583	23 53 23	2563
	Saturn E.	57 2 2	2580	55 22 39	2567	53 42 59	2555	52 3 2	2542
	Regulus E.	65 21 33	2592	63 42 25	2578	62 3 0	2565	60 23 17	2552
29	SUN W.	86 24 0	2922	87 57 58	2908	89 32 15	2793	91 6 52	2778
	Venus W.	44 53 8	2981	46 25 51	2966	47 58 55	2948	49 32 21	2932
	Aldebaran W.	29 14 36	2766	30 50 2	2716	32 26 20	2690	34 3 27	2647
	Saturn E.	43 38 48	2477	41 57 2	2464	40 14 58	2450	38 32 35	2438
	Regulus E.	52 0 10	2486	50 18 36	2472	48 36 44	2456	46 54 32	2445
	Spica E.	106 3 23	2487	104 21 51	2472	102 39 59	2468	100 57 47	2445
30	SUN W.	99 4 55	2702	100 41 32	2686	102 18 28	2672	103 55 45	2657
	Venus W.	57 24 40	2753	59 0 10	2736	60 36 2	2720	62 12 15	2704
	Aldebaran W.	42 19 15	2612	44 0 12	2489	45 41 41	2467	47 23 40	2446
	Saturn E.	29 56 2	2372	28 11 49	2361	26 27 18	2349	24 42 30	2338
	Regulus E.	38 18 44	2377	36 34 36	2364	34 50 9	2350	33 5 22	2337
	Spica E.	92 21 52	2374	90 37 40	2360	88 53 8	2346	87 8 15	2332
31	SUN W.	112 7 5	2585	113 46 20	2672	115 25 54	2659	117 5 45	2645
	Venus W.	70 18 35	2627	71 56 53	2612	73 35 31	2599	75 14 27	2586
	Aldebaran W.	56 0 41	2353	57 45 24	2336	59 30 31	2320	61 16 2	2306
	Regulus E.	24 16 53	2277	22 30 20	2267	20 43 32	2256	18 56 30	2250
	Spica E.	78 18 49	2264	76 31 56	2250	74 44 43	2237	72 57 11	2225



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to		Diff. for 1 hour.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.		Semi-diameter.	subtracted from Apparent Time.	
		h. m. s.	s.		° ' " "	"					
Sun.	1	0 44 5.65	9.099	N. 4 44 37.1	57.72	16 1.87	64.50	3 49.13	0.758		
Mon.	2	0 47 44.04	9.104	5 7 39.6	57.50	16 1.60	64.52	3 31.00	0.753		
Tues.	3	0 51 22.55	9.109	5 30 36.6	57.26	16 1.33	64.54	3 13.01	0.748		
Wed.	4	0 55 1.19	9.115	5 53 27.7	57.02	16 1.06	64.57	2 55.15	0.741		
Thur.	5	0 58 39.99	9.122	6 16 12.8	56.75	16 0.78	64.60	2 37.45	0.734		
Fri.	6	1 2 18.99	9.130	6 38 51.7	56.49	16 0.50	64.63	2 19.94	0.725		
Sat.	7	1 5 58.21	9.139	7 1 23.8	56.20	16 0.23	64.66	2 2.64	0.716		
Sun.	8	1 9 37.66	9.149	7 23 48.5	55.89	15 59.96	64.70	1 45.57	0.708		
Mon.	9	1 13 17.36	9.160	7 46 5.9	55.57	15 59.69	64.74	1 28.76	0.694		
Tues.	10	1 16 57.31	9.172	8 8 15.8	55.24	15 59.41	64.78	1 12.23	0.682		
Wed.	11	1 20 37.57	9.185	8 30 17.7	54.90	15 59.13	64.82	0 55.98	0.670		
Thur.	12	1 24 18.16	9.198	8 52 11.0	54.55	15 58.86	64.86	0 40.05	0.657		
Fri.	13	1 27 59.08	9.213	9 13 55.5	54.18	15 58.59	64.91	0 24.47	0.643		
Sat.	14	1 31 40.34	9.228	9 35 30.9	53.79	15 58.32	64.96	0 9.23	0.628		
Sun.	15	1 35 21.96	9.244	9 56 57.0	53.39	15 58.05	65.01	0 5.67	0.613		
Mon.	16	1 39 3.95	9.260	10 18 13.6	52.98	15 57.78	65.06	0 20.19	0.597		
Tues.	17	1 42 46.33	9.277	10 39 20.0	52.55	15 57.51	65.12	0 34.32	0.581		
Wed.	18	1 46 29.13	9.294	11 0 15.8	52.10	15 57.24	65.18	0 48.05	0.564		
Thur.	19	1 50 12.34	9.311	11 21 0.6	51.65	15 56.97	65.24	1 1.36	0.546		
Fri.	20	1 53 55.97	9.329	11 41 34.4	51.18	15 56.71	65.30	1 14.24	0.528		
Sat.	21	1 57 40.04	9.347	12 1 56.8	50.69	15 56.45	65.36	1 26.69	0.510		
Sun.	22	2 1 24.55	9.366	12 22 7.2	50.19	15 56.20	65.43	1 38.71	0.491		
Mon.	23	2 5 9.51	9.385	12 42 5.4	49.67	15 55.95	65.50	1 50.27	0.472		
Tues.	24	2 8 54.93	9.404	13 1 51.2	49.14	15 55.70	65.57	2 1.37	0.452		
Wed.	25	2 12 40.82	9.424	13 21 24.1	48.59	15 55.46	65.64	2 12.00	0.432		
Thur.	26	2 16 27.19	9.444	13 40 43.6	48.03	15 55.22	65.71	2 22.16	0.412		
Fri.	27	2 20 14.04	9.464	13 59 49.5	47.46	15 54.98	65.78	2 31.84	0.392		
Sat.	28	2 24 1.38	9.484	14 18 41.5	46.88	15 54.74	65.86	2 41.03	0.372		
Sun.	29	2 27 49.22	9.505	14 37 19.4	46.28	15 54.50	65.94	2 49.73	0.351		
Mon.	30	2 31 37.57	9.526	14 55 42.9	45.67	15 54.27	66.01	2 57.91	0.330		
Tues.	31	2 35 26.44	9.547	N.15 13 51.5	45.05	15 54.04	66.09	3 5.57	0.308		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be subtracted from		Diff. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.	added to Mean Time.			
		h. m. s.	s.		° ' " "	"					
Sun.	1	0 44 5.08	9.099	N. 4 44 33.4	57.72	3 49.19	0.758	0 40 15.89			
Mon.	2	0 47 43.51	9.104	5 7 36.2	57.50	3 31.06	0.753	0 44 12.45			
Tues.	3	0 51 22.06	9.109	5 30 33.5	57.26	3 13.06	0.748	0 48 9.00			
Wed.	4	0 55 0.75	9.115	5 53 24.9	57.02	2 55.19	0.741	0 52 5.56			
Thur.	5	0 58 39.60	9.122	6 16 10.3	56.75	2 37.49	0.734	0 56 2.11			
Fri.	6	1 2 18.64	9.130	6 38 49.5	56.49	2 19.98	0.725	0 59 58.66			
Sat.	7	1 5 57.90	9.139	7 1 21.9	56.20	2 2.68	0.715	1 3 55.22			
Sun.	8	1 9 37.39	9.149	7 23 46.9	55.89	1 45.62	0.705	1 7 51.77			
Mon.	9	1 13 17.13	9.160	7 46 4.5	55.57	1 28.80	0.694	1 11 48.33			
Tues.	10	1 16 57.13	9.172	8 8 14.7	55.24	1 12.25	0.682	1 15 44.88			
Wed.	11	1 20 37.43	9.185	8 30 16.9	54.90	0 56.00	0.670	1 19 41.43			
Thur.	12	1 24 18.06	9.198	8 52 10.5	54.55	0 40.07	0.657	1 23 37.99			
Fri.	13	1 27 59.02	9.213	9 13 55.2	54.18	0 24.48	0.643	1 27 34.54			
Sat.	14	1 31 40.32	9.228	9 35 30.8	53.79	0 9.23	0.628	1 31 31.09			
Sun.	15	1 35 21.98	9.244	9 56 57.1	53.39	0 5.67	0.613	1 35 27.65			
Mon.	16	1 39 4.01	9.260	10 18 13.9	52.98	0 20.19	0.597	1 39 24.20			
Tues.	17	1 42 46.43	9.277	10 39 20.5	52.55	0 34.32	0.581	1 43 20.75			
Wed.	18	1 46 29.26	9.294	11 0 16.5	52.10	0 48.05	0.564	1 47 17.31			
Thur.	19	1 50 12.50	9.311	11 21 1.5	51.65	1 1.36	0.546	1 51 13.86			
Fri.	20	1 53 56.17	9.329	11 41 35.5	51.18	1 14.25	0.528	1 55 10.42			
Sat.	21	1 57 40.27	9.347	12 1 58.1	50.69	1 26.70	0.510	1 59 6.97			
Sun.	22	2 1 24.81	9.366	12 22 8.7	50.19	1 38.72	0.491	2 3 3.53			
Mon.	23	2 5 9.80	9.385	12 42 7.0	49.67	1 50.28	0.472	2 7 0.08			
Tues.	24	2 8 55.25	9.404	13 1 52.9	49.14	2 1.39	0.452	2 10 56.64			
Wed.	25	2 12 41.17	9.424	13 21 25.9	48.59	2 12.02	0.432	2 14 53.19			
Thur.	26	2 16 27.57	9.444	13 40 45.5	48.03	2 22.18	0.412	2 18 49.75			
Fri.	27	2 20 14.45	9.464	13 59 51.5	47.46	2 31.85	0.392	2 22 46.30			
Sat.	28	2 24 1.81	9.484	14 18 43.6	46.88	2 41.05	0.372	2 26 42.86			
Sun.	29	2 27 49.67	9.505	14 37 21.6	46.28	2 49.75	0.351	2 30 39.42			
Mon.	30	2 31 38.04	9.526	14 55 45.2	45.67	2 57.93	0.330	2 34 35.97			
Tues.	31	2 35 26.93	9.547	N.15 13 53.9	45.05	3 5.60	0.308	2 38 32.53			

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	92	11 59 32.6	59 7.2	147.75	+0.20	0.0000531	51.3	23 15 54.79	
2	93	12 58 37.5	58 12.0	147.66	+0.08	.0001762	51.3	23 11 58.88	
3	94	13 57 40.2	57 14.6	147.57	-0.03	.0002995	51.5	23 8 2.97	
4	95	14 56 40.7	56 15.0	147.48	0.12	.0004232	51.6	23 4 7.06	
5	96	15 55 39.1	55 13.3	147.39	0.20	.0005473	51.8	23 0 11.15	
6	97	16 54 35.4	54 9.5	147.31	0.25	.0006719	52.0	22 56 15.24	
7	98	17 53 29.7	53 8.7	147.22	0.26	.0007968	52.1	22 52 19.33	
8	99	18 52 22.1	51 56.0	147.14	0.25	.0009220	52.2	22 48 23.43	
9	100	19 51 12.6	50 46.4	147.07	0.21	.0010473	52.2	22 44 27.52	
10	101	20 50 1.3	49 34.9	146.99	0.15	.0011727	52.2	22 40 31.61	
11	102	21 48 48.3	48 21.8	146.92	-0.06	.0012979	52.1	22 36 35.70	
12	103	22 47 33.6	47 7.0	146.84	+0.06	.0014228	51.9	22 32 39.80	
13	104	23 46 17.1	45 50.4	146.77	0.20	.0015474	51.7	22 28 43.90	
14	105	24 44 58.8	44 32.0	146.70	0.34	.0016715	51.5	22 24 47.99	
15	106	25 43 38.8	42 11.8	146.63	0.47	.0017950	51.3	22 20 52.08	
16	107	26 42 17.2	41 50.1	146.56	0.60	.0019176	50.9	22 16 56.17	
17	108	27 40 54.0	40 26.8	146.49	0.71	.0020392	50.4	22 13 0.26	
18	109	28 39 29.1	39 1.8	146.42	0.80	.0021597	49.9	22 9 4.36	
19	110	29 38 2.4	37 34.9	146.35	0.88	.0022789	49.4	22 5 8.45	
20	111	30 36 33.8	36 6.1	146.27	0.93	.0023968	48.8	22 1 12.54	
21	112	31 35 3.2	34 35.4	146.19	0.94	.0025133	48.2	21 57 16.63	
22	113	32 33 30.6	33 2.7	146.10	0.93	.0026284	47.6	21 53 20.72	
23	114	33 31 56.2	31 28.2	146.02	0.89	.0027422	47.0	21 49 24.81	
24	115	34 30 19.8	29 51.7	145.94	0.81	.0028546	46.5	21 45 28.90	
25	116	35 28 41.4	28 13.1	145.86	0.71	.0029657	46.0	21 41 32.99	
26	117	36 27 1.0	26 32.7	145.77	0.59	.0030755	45.5	21 37 37.06	
27	118	37 25 18.5	24 50.0	145.68	0.46	.0031841	45.0	21 33 41.17	
28	119	38 23 33.9	23 5.3	145.59	0.33	.0032917	44.6	21 29 45.26	
29	120	39 21 47.1	21 18.3	145.50	0.19	.0033988	44.2	21 25 49.35	
30	121	40 19 58.2	19 29.2	145.42	+0.08	.0035041	43.9	21 21 53.44	
31	122	41 18 7.5	17 38.4	145.34	-0.02	0.0036091	43.6	21 17 57.53	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
							h. m.	m.	
1	16 19.3	16 24.4	59 47.6	+1.63	60 6.2	+1.46	8 31.1	2.24	9.9
2	16 28.8	16 32.4	60 22.4	1.21	60 35.7	0.98	9 23.9	2.17	10.9
3	16 35.1	16 36.8	60 45.7	+0.68	60 51.9	+0.35	10 15.6	2.14	11.9
4	16 37.4	16 36.7	60 53.9	-0.02	60 51.5	-0.38	11 7.0	2.16	12.9
5	16 34.9	16 31.9	60 44.8	0.74	60 33.9	1.08	11 59.4	2.21	13.9
6	16 27.8	16 22.8	60 18.9	1.40	60 0.4	1.68	12 53.5	2.30	14.9
7	16 16.9	16 10.4	59 38.9	1.90	59 14.8	2.09	13 49.7	2.38	15.9
8	16 3.3	15 55.9	58 48.9	2.21	58 21.8	2.29	14 47.3	2.42	16.9
9	15 48.4	15 40.9	57 54.1	2.32	57 26.4	2.29	15 45.3	2.40	17.9
10	15 33.5	15 26.4	56 59.4	2.22	56 33.3	2.12	16 41.8	2.30	18.9
11	15 19.7	15 13.5	56 8.7	1.98	55 45.9	1.82	17 35.4	2.16	19.9
12	15 7.8	15 2.8	55 25.2	1.64	55 6.6	1.45	18 25.3	2.00	20.9
13	14 58.4	14 54.7	54 50.5	1.24	54 36.8	1.04	19 11.6	1.86	21.9
14	14 51.6	14 49.3	54 25.6	0.88	54 16.9	0.62	19 54.9	1.75	22.9
15	14 47.6	14 46.5	54 10.6	0.42	54 6.8	-0.22	20 36.0	1.68	23.9
16	14 46.1	14 46.3	54 5.3	-0.04	54 5.9	+0.13	21 15.8	1.65	24.9
17	14 47.0	14 48.2	54 8.5	+0.30	54 13.1	0.45	21 55.4	1.68	25.9
18	14 49.9	14 52.0	54 19.3	0.58	54 27.1	0.71	22 35.9	1.72	26.9
19	14 54.5	14 57.3	54 36.2	0.81	54 46.5	0.90	23 18.2	1.81	27.9
20	15 0.4	15 3.7	54 57.7	0.97	55 9.9	1.04	6		28.9
21	15 7.2	15 10.9	55 22.7	1.10	55 36.2	1.15	0 3.2	1.94	0.3
22	15 14.7	15 18.6	55 50.2	1.18	56 4.6	1.21	0 51.6	2.10	1.3
23	15 22.6	15 26.7	56 19.2	1.23	56 34.2	1.26	1 43.7	2.25	2.3
24	15 30.8	15 35.0	56 49.4	1.27	57 4.8	1.29	2 39.1	2.36	3.3
25	15 39.2	15 43.5	57 20.4	1.30	57 36.0	1.30	3 36.5	2.41	4.3
26	15 47.8	15 52.0	57 51.7	1.31	58 7.4	1.30	4 34.1	2.38	5.3
27	15 56.3	16 0.4	58 22.9	1.28	58 38.2	1.26	5 30.4	2.30	6.3
28	16 4.5	16 8.4	58 53.1	1.22	59 7.4	1.15	6 24.4	2.20	7.3
29	16 12.0	16 15.3	59 20.7	1.07	59 32.9	0.96	7 16.2	2.12	8.3
30	16 18.2	16 20.6	59 43.6	0.82	59 52.4	0.65	8 6.5	2.07	9.3
31	16 22.4	16 23.5	59 59.0	+0.45	60 3.1	+0.23	8 56.2	2.08	10.3



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 1.					TUESDAY 3.				
0	8 52 40.01	2.3498	N. 17 24 36.7	12.857	0	10 42 28.09	2.3280	N. 5 22 5.9	16.620
1	8 55 1.10	2.3499	17 11 42.0	12.971	1	10 44 42.45	2.3286	5 5 27.5	16.657
2	8 57 22.00	2.3467	16 58 40.3	12.084	2	10 46 56.75	2.3279	4 48 47.0	16.692
3	8 59 42.71	2.3436	16 45 31.9	12.196	3	10 49 11.00	2.3271	4 32 4.4	16.726
4	9 2 3.23	2.3404	16 32 16.8	12.307	4	10 51 25.30	2.3263	4 15 19.9	16.758
5	9 4 23.55	2.3372	16 18 55.1	12.417	5	10 53 39.36	2.3256	3 58 33.5	16.787
6	9 6 43.69	2.3340	16 5 26.8	12.526	6	10 55 53.47	2.3249	3 41 45.5	16.814
7	9 9 3.64	2.3308	15 51 52.1	12.631	7	10 58 7.54	2.3242	3 24 55.9	16.839
8	9 11 23.40	2.3276	15 38 11.1	12.736	8	11 0 21.58	2.3236	3 8 4.8	16.862
9	9 13 42.98	2.3247	15 24 23.8	12.839	9	11 2 35.59	2.3233	2 51 12.4	16.884
10	9 16 2.37	2.3217	15 10 30.4	12.941	10	11 4 49.57	2.3230	2 34 18.7	16.904
11	9 18 21.58	2.3187	14 56 30.9	13.042	11	11 7 3.53	2.3226	2 17 23.9	16.922
12	9 20 40.61	2.3157	14 42 25.3	13.141	12	11 9 17.48	2.3224	2 0 28.0	16.938
13	9 22 59.46	2.3126	14 28 13.9	13.239	13	11 11 31.41	2.3222	1 43 31.2	16.953
14	9 25 18.14	2.3099	14 13 56.6	13.335	14	11 13 45.34	2.3221	1 26 33.6	16.966
15	9 27 36.65	2.3070	13 59 33.6	13.430	15	11 15 59.26	2.3220	1 9 35.3	16.976
16	9 29 54.98	2.3042	13 45 5.0	13.523	16	11 18 13.18	2.3221	0 52 36.5	16.983
17	9 32 13.15	2.3014	13 30 30.9	13.614	17	11 20 27.11	2.3222	0 35 37.2	16.992
18	9 34 31.15	2.2986	13 15 51.3	13.704	18	11 22 41.04	2.3224	0 18 37.5	16.997
19	9 36 48.99	2.2959	13 1 6.4	13.792	19	11 24 54.99	2.3227	N. 0 1 37.6	16.999
20	9 39 6.66	2.2932	12 46 16.2	13.879	20	11 27 8.96	2.3230	S. 0 15 22.4	16.999
21	9 41 24.17	2.2906	12 31 20.9	13.964	21	11 29 22.95	2.3233	0 32 22.4	16.996
22	9 43 41.53	2.2880	12 16 20.5	14.047	22	11 31 36.96	2.3236	0 49 22.2	16.996
23	9 45 58.74	2.2853	N. 12 1 15.2	14.129	23	11 33 51.00	2.3243	S. 1 6 21.9	16.992
MONDAY 2.					WEDNESDAY 4.				
0	9 48 15.79	2.2826	N. 11 46 5.0	14.209	0	11 36 5.07	2.3249	S. 1 23 21.2	16.986
1	9 50 32.69	2.2806	11 30 50.0	14.298	1	11 38 19.18	2.3256	1 40 20.1	16.977
2	9 52 49.45	2.2781	11 15 30.4	14.385	2	11 40 33.34	2.3264	1 57 18.4	16.966
3	9 55 6.07	2.2757	11 0 6.2	14.440	3	11 42 47.55	2.3272	2 14 16.0	16.953
4	9 57 22.54	2.2734	10 44 37.6	14.513	4	11 45 1.80	2.3280	2 31 12.8	16.939
5	9 59 38.88	2.2712	10 29 4.6	14.585	5	11 47 16.11	2.3289	2 48 8.7	16.922
6	10 1 55.08	2.2690	10 13 27.4	14.656	6	11 49 30.47	2.3299	3 5 3.6	16.905
7	10 4 11.16	2.2669	9 57 46.0	14.724	7	11 51 44.90	2.3310	3 21 57.3	16.885
8	10 6 27.11	2.2648	9 42 0.5	14.791	8	11 53 59.39	2.3322	3 38 49.8	16.863
9	10 8 42.94	2.2628	9 26 11.1	14.856	9	11 56 13.96	2.3334	3 55 40.9	16.839
10	10 10 58.65	2.2609	9 10 17.8	14.920	10	11 58 28.60	2.3347	4 12 30.5	16.812
11	10 13 14.25	2.2590	8 54 20.7	14.982	11	12 0 43.32	2.3361	4 29 18.5	16.783
12	10 15 29.73	2.2571	8 38 20.0	15.041	12	12 2 58.13	2.3375	4 46 4.7	16.752
13	10 17 45.10	2.2553	8 22 15.8	15.099	13	12 5 13.02	2.3389	5 2 49.1	16.722
14	10 20 0.37	2.2536	8 6 8.1	15.156	14	12 7 28.00	2.3405	5 19 31.5	16.690
15	10 22 15.53	2.2519	7 49 57.1	15.211	15	12 9 43.08	2.3421	5 36 11.9	16.653
16	10 24 30.60	2.2502	7 33 42.8	15.263	16	12 11 58.25	2.3438	5 52 50.1	16.618
17	10 26 45.58	2.2486	7 17 25.4	15.314	17	12 14 13.53	2.3455	6 9 26.0	16.578
18	10 29 0.46	2.2472	7 1 5.1	15.363	18	12 16 28.91	2.3473	6 25 59.5	16.536
19	10 31 15.26	2.2459	6 44 41.8	15.411	19	12 18 44.40	2.3492	6 42 30.4	16.492
20	10 33 29.97	2.2446	6 28 15.8	15.456	20	12 21 0.01	2.3511	6 58 58.7	16.448
21	10 35 44.61	2.2433	6 11 47.1	15.500	21	12 23 15.73	2.3530	7 15 24.2	16.402
22	10 37 59.17	2.2421	5 55 15.8	15.542	22	12 25 31.57	2.3550	7 31 46.9	16.354
23	10 40 13.66	2.2410	5 38 42.0	15.582	23	12 27 47.53	2.3571	7 48 6.6	16.303
24	10 42 28.09	2.2399	N. 5 22 5.9	15.620	24	12 30 3.62	2.3593	S. 8 4 23.2	16.250



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 5.					SATURDAY 7.				
0	19 30 3.62	2.2998	S. 8 4 23.2	16.220	0	14 22 12.97	2.4118	S. 19 29 30.4	11.665
1	19 32 19.84	2.2715	8 20 36.6	16.196	1	14 24 37.77	2.4149	19 41 5.7	11.821
2	19 34 36.20	2.2737	8 36 46.6	16.128	2	14 27 2.70	2.4179	19 52 32.9	11.896
3	19 36 52.69	2.2760	8 52 53.2	16.090	3	14 29 27.93	2.4209	20 3 52.0	11.260
4	19 39 9.32	2.2784	9 8 56.2	16.019	4	14 31 53.27	2.4239	20 15 2.9	11.113
5	19 41 26.10	2.2806	9 24 55.5	15.967	5	14 34 18.79	2.4268	20 26 5.5	10.974
6	19 43 43.02	2.2828	9 40 51.1	15.933	6	14 36 44.49	2.4298	20 36 59.8	10.884
7	19 46 0.09	2.2857	9 56 42.8	15.928	7	14 39 10.36	2.4327	20 47 45.6	10.693
8	19 48 17.31	2.2886	10 12 30.5	15.761	8	14 41 36.41	2.4356	20 58 22.9	10.551
9	19 50 34.09	2.2909	10 28 14.1	15.692	9	14 44 2.63	2.4383	21 8 51.6	10.407
10	19 52 52.32	2.2935	10 43 53.5	15.621	10	14 46 29.01	2.4411	21 19 11.7	10.262
11	19 55 9.91	2.2963	10 59 28.6	15.548	11	14 48 55.56	2.4438	21 29 23.1	10.117
12	19 57 27.76	2.2989	11 14 59.2	15.473	12	14 51 22.26	2.4464	21 39 25.7	9.971
13	19 59 45.78	2.3017	11 30 25.3	15.396	13	14 53 49.12	2.4490	21 49 19.5	9.823
14	19 2 3.97	2.3045	11 45 46.7	15.317	14	14 56 16.14	2.4516	21 59 4.4	9.674
15	19 4 22.33	2.3074	12 1 3.3	15.237	15	14 58 43.31	2.4540	22 8 40.4	9.526
16	19 6 40.86	2.3108	12 16 15.1	15.154	16	15 1 10.62	2.4564	22 18 7.4	9.374
17	19 8 59.57	2.3132	12 31 21.8	15.070	17	15 3 38.08	2.4587	22 27 25.4	9.223
18	19 11 18.45	2.3163	12 46 23.5	14.984	18	15 6 5.67	2.4610	22 36 34.2	9.071
19	19 13 37.51	2.3192	13 1 20.0	14.897	19	15 8 33.39	2.4632	22 45 33.9	8.917
20	19 15 56.75	2.3222	13 16 11.2	14.808	20	15 11 1.25	2.4653	22 54 24.3	8.763
21	19 18 16.17	2.3252	13 30 57.0	14.717	21	15 13 29.23	2.4674	23 3 5.5	8.608
22	19 20 35.78	2.3283	13 45 37.3	14.625	22	15 15 57.34	2.4694	23 11 37.3	8.453
23	19 22 55.57	2.3314	S. 14 0 12.0	14.531	23	15 18 25.57	2.4714	S. 23 19 59.8	8.297
FRIDAY 6.					SUNDAY 8.				
0	13 25 15.55	2.2845	S. 14 14 41.0	14.435	0	15 20 53.91	2.4739	S. 23 28 12.9	8.140
1	13 27 35.72	2.2877	14 29 4.2	14.357	1	15 23 22.36	2.4760	23 36 16.5	7.992
2	13 29 56.08	2.2908	14 43 21.4	14.288	2	15 25 50.91	2.4767	23 44 10.7	7.834
3	13 32 16.62	2.2940	14 57 32.7	14.187	3	15 28 19.56	2.4788	23 51 55.4	7.685
4	13 34 37.36	2.2972	15 11 37.8	14.084	4	15 30 48.30	2.4798	23 59 30.5	7.536
5	13 36 58.29	2.2904	15 25 36.7	13.929	5	15 33 17.13	2.4812	24 6 56.0	7.344
6	13 39 19.41	2.2936	15 39 29.3	13.823	6	15 35 46.05	2.4826	24 14 11.8	7.183
7	13 41 40.73	2.2969	15 53 15.5	13.715	7	15 38 15.04	2.4836	24 21 18.0	7.022
8	13 44 2.24	2.2901	16 6 55.1	13.606	8	15 40 44.10	2.4849	24 28 14.5	6.860
9	13 46 23.95	2.2934	16 20 28.2	13.496	9	15 43 13.23	2.4860	24 35 1.3	6.698
10	13 48 45.85	2.2967	16 33 54.6	13.383	10	15 45 42.42	2.4870	24 41 38.3	6.535
11	13 51 7.95	2.2970	16 47 14.2	13.269	11	15 48 11.67	2.4879	24 48 5.5	6.373
12	13 53 30.25	2.2978	17 0 26.9	13.154	12	15 50 40.97	2.4887	24 54 22.9	6.208
13	13 55 52.75	2.2986	17 13 32.7	13.037	13	15 53 10.32	2.4894	25 0 30.6	6.044
14	13 58 15.44	2.2998	17 26 31.4	12.918	14	15 55 39.70	2.4899	25 6 28.2	5.880
15	14 0 38.32	2.2990	17 39 22.9	12.798	15	15 58 9.11	2.4904	25 12 16.1	5.716
16	14 3 1.40	2.2986	17 52 7.2	12.676	16	16 0 38.55	2.4908	25 17 54.1	5.551
17	14 5 24.67	2.2986	18 4 44.1	12.553	17	16 3 8.01	2.4911	25 23 22.2	5.386
18	14 7 48.14	2.2977	18 17 13.6	12.429	18	16 5 37.49	2.4918	25 28 40.4	5.221
19	14 10 11.80	2.2969	18 29 35.6	12.304	19	16 8 0.97	2.4912	25 33 48.7	5.056
20	14 12 35.65	2.2961	18 41 50.1	12.177	20	16 10 36.45	2.4912	25 38 47.1	4.890
21	14 14 59.69	2.4028	18 53 56.9	12.048	21	16 13 5.92	2.4911	25 43 35.5	4.734
22	14 17 23.93	2.4056	19 5 55.9	11.913	22	16 15 35.38	2.4908	25 48 14.0	4.568
23	14 19 48.36	2.4087	19 17 47.1	11.787	23	16 18 4.82	2.4906	25 52 42.5	4.392
24	14 22 12.97	2.4118	S. 19 29 30.4	11.665	24	16 20 34.24	2.4900	S. 25 57 1.0	4.226



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 9.					WEDNESDAY 11.				
0	h. m. s.	s.	S. O. I. "	"	0	h. m. s.	s.	S. O. I. "	"
1	16 20 34.24	2.4890	S. 25 57 1.0	4.926	1	18 17 30.94	2.3444	S. 26 14 21.8	3.361
2	16 23 3.62	2.4894	26 1 9.6	4.060	2	18 19 51.51	2.3468	26 11 0.8	3.419
3	16 25 32.97	2.4897	26 5 8.9	3.864	3	18 22 11.77	2.3481	26 7 31.5	3.506
4	16 28 2.28	2.4899	26 8 56.9	3.798	4	18 24 31.72	2.3490	26 3 54.0	3.623
5	16 30 31.53	2.4871	26 12 35.6	3.662	5	18 26 51.26	2.3446	26 0 8.3	3.629
6	16 33 0.73	2.4861	26 16 4.4	3.367	6	18 29 10.68	2.3168	25 56 14.5	3.863
7	16 35 29.86	2.4860	26 19 23.3	3.282	7	18 31 29.67	2.3130	25 52 12.7	4.086
8	16 37 58.92	2.4837	26 22 32.3	3.067	8	18 33 48.34	2.3065	25 48 2.9	4.229
9	16 40 27.90	2.4828	26 25 31.3	2.992	9	18 36 6.69	2.3081	25 43 45.2	4.361
10	16 42 56.80	2.4808	26 28 20.4	2.787	10	18 38 24.71	2.3076	25 39 19.6	4.491
11	16 45 25.60	2.4798	26 30 59.7	2.672	11	18 40 42.40	2.3030	25 34 46.3	4.620
12	16 47 54.31	2.4776	26 33 29.0	2.407	12	18 42 59.75	2.3064	25 30 5.3	4.748
13	16 50 22.91	2.4756	26 35 48.5	2.249	13	18 45 16.77	2.3008	25 25 16.6	4.975
14	16 52 51.40	2.4739	26 37 58.1	2.078	14	18 47 33.45	2.2762	25 20 20.3	5.204
15	16 55 19.78	2.4719	26 39 57.9	1.916	15	18 49 49.79	2.2685	25 15 16.5	5.436
16	16 57 48.03	2.4697	26 41 47.9	1.762	16	18 52 5.79	2.2688	25 10 5.2	5.668
17	17 0 16.15	2.4678	26 43 28.2	1.590	17	18 54 21.44	2.2680	25 4 46.5	5.873
18	17 2 44.13	2.4659	26 44 58.7	1.427	18	18 56 36.74	2.2638	24 59 20.4	6.096
19	17 5 11.97	2.4628	26 46 19.5	1.265	19	18 58 51.70	2.2464	24 53 47.1	6.316
20	17 7 39.66	2.4603	26 47 30.6	1.104	20	19 1 6.31	2.2405	24 48 6.5	6.536
21	17 10 7.19	2.4576	26 48 32.0	0.943	21	19 3 30.57	2.2348	24 42 18.8	6.766
22	17 12 34.56	2.4547	26 49 23.8	0.782	22	19 5 54.48	2.2280	24 36 24.0	6.972
23	17 15 1.76	2.4518	26 50 5.9	0.623	23	19 7 48.04	2.2261	24 30 22.2	7.198
24	17 17 28.78	2.4488	S. 26 50 38.5	0.468	24	19 10 1.25	2.2172	S. 24 24 13.4	7.408
TUESDAY 10.					THURSDAY 12.				
0	17 19 55.62	2.4487	S. 26 51 1.5	0.304	0	19 12 14.10	2.2112	S. 24 17 57.8	6.317
1	17 22 22.27	2.4426	26 51 15.0	0.146	1	19 14 26.60	2.2064	24 11 35.3	6.431
2	17 24 48.73	2.4398	26 51 19.0	0.011	2	19 16 38.75	2.1996	24 5 6.1	6.543
3	17 27 14.99	2.4380	26 51 13.6	0.106	3	19 18 50.54	2.1986	23 58 30.2	6.644
4	17 29 41.05	2.4328	26 50 58.9	0.394	4	19 21 1.98	2.1877	23 51 47.6	6.764
5	17 32 6.90	2.4320	26 50 34.8	0.479	5	19 23 13.06	2.1817	23 44 58.5	6.873
6	17 34 32.53	2.4353	26 50 1.4	0.634	6	19 25 23.78	2.1788	23 38 2.9	6.980
7	17 36 57.94	2.4316	26 49 18.7	0.788	7	19 27 34.15	2.1699	23 31 0.9	7.087
8	17 39 23.12	2.4177	26 48 26.8	0.941	8	19 29 44.17	2.1640	23 23 52.5	7.193
9	17 41 48.06	2.4128	26 47 25.7	1.084	9	19 31 53.83	2.1581	23 16 37.8	7.297
10	17 44 12.77	2.4098	26 46 15.5	1.246	10	19 34 3.14	2.1522	23 9 16.8	7.401
11	17 46 37.23	2.4057	26 44 56.2	1.397	11	19 36 12.09	2.1463	23 1 49.7	7.508
12	17 49 1.45	2.4015	26 43 27.9	1.547	12	19 38 20.69	2.1404	22 54 16.4	7.608
13	17 51 25.41	2.3972	26 41 50.6	1.697	13	19 40 28.94	2.1345	22 46 37.1	7.706
14	17 53 49.12	2.3928	26 40 4.3	1.845	14	19 42 36.83	2.1286	22 38 51.8	7.804
15	17 56 12.56	2.3884	26 38 9.2	1.993	15	19 44 44.38	2.1226	22 31 0.6	7.902
16	17 58 35.73	2.3839	26 36 5.2	2.140	16	19 46 51.57	2.1169	22 23 3.5	8.000
17	18 0 58.63	2.3793	26 33 53.4	2.286	17	19 48 58.41	2.1111	22 15 0.6	8.096
18	18 3 21.25	2.3747	26 31 30.9	2.430	18	19 51 4.90	2.1053	22 6 52.0	8.191
19	18 5 43.59	2.3700	26 29 0.8	2.574	19	19 53 11.05	2.0996	21 58 37.7	8.285
20	18 8 5.65	2.3652	26 26 23.0	2.717	20	19 55 16.85	2.0938	21 50 17.8	8.378
21	18 10 27.42	2.3608	26 23 34.7	2.860	21	19 57 22.31	2.0881	21 41 52.4	8.468
22	18 12 48.89	2.3554	26 20 38.8	3.002	22	19 59 27.42	2.0824	21 33 21.5	8.560
23	18 15 10.07	2.3504	26 17 34.5	3.143	23	20 1 32.19	2.0767	21 24 45.2	8.650
24	18 17 30.94	2.3454	S. 26 14 21.8	3.281	24	20 3 36.63	2.0710	S. 21 16 3.5	8.739



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 13.					SUNDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	20 3 36.63	2.0710	S. 21 16 3.5	8.729	0	21 37 16.80	1.8510	S. 12 52 10.9	11.919
1	20 5 40.72	2.0684	21 7 16.5	8.827	1	21 39 7.77	1.8478	12 40 14.4	11.965
2	20 7 44.48	2.0669	20 58 24.3	8.913	2	21 40 58.54	1.8446	12 28 15.1	12.010
3	20 9 47.91	2.0643	20 49 26.9	8.999	3	21 42 49.12	1.8415	12 16 13.1	12.055
4	20 11 51.00	2.0606	20 40 24.4	9.084	4	21 44 39.52	1.8385	12 4 8.5	12.099
5	20 13 53.76	2.0488	20 31 16.8	9.168	5	21 46 29.74	1.8356	11 52 1.3	12.142
6	20 15 56.19	2.0378	20 22 4.2	9.261	6	21 48 19.78	1.8326	11 39 51.5	12.184
7	20 17 58.30	2.0284	20 12 46.6	9.353	7	21 50 9.65	1.8297	11 27 39.2	12.226
8	20 20 0.08	2.0270	20 3 24.2	9.414	8	21 51 59.34	1.8269	11 15 24.4	12.266
9	20 22 1.54	2.0217	19 53 56.9	9.494	9	21 53 48.87	1.8242	11 3 7.2	12.306
10	20 24 2.68	2.0184	19 44 24.9	9.572	10	21 55 38.24	1.8215	10 50 47.7	12.345
11	20 26 3.50	2.0111	19 34 48.2	9.651	11	21 57 27.45	1.8189	10 38 25.8	12.383
12	20 28 4.01	2.0066	19 25 6.8	9.728	12	21 59 16.51	1.8164	10 26 1.7	12.421
13	20 30 4.90	2.0006	19 15 20.8	9.804	13	22 1 5.42	1.8139	10 13 35.3	12.459
14	20 32 4.08	1.9966	19 5 30.3	9.879	14	22 2 54.18	1.8116	10 1 6.0	12.496
15	20 34 3.66	1.9904	18 55 35.3	9.953	15	22 4 42.80	1.8091	9 48 35.8	12.531
16	20 36 2.93	1.9868	18 45 35.9	10.027	16	22 6 31.27	1.8069	9 36 2.9	12.566
17	20 38 1.90	1.9808	18 35 32.1	10.100	17	22 8 19.61	1.8046	9 23 27.9	12.601
18	20 40 0.57	1.9754	18 25 23.9	10.172	18	22 10 7.82	1.8024	9 10 50.8	12.634
19	20 41 58.95	1.9706	18 15 11.5	10.242	19	22 11 55.90	1.8003	8 58 11.8	12.667
20	20 43 57.03	1.9666	18 4 54.9	10.311	20	22 13 43.85	1.7983	8 45 30.8	12.699
21	20 45 54.92	1.9607	17 54 34.1	10.380	21	22 15 31.69	1.7963	8 32 47.9	12.731
22	20 47 52.32	1.9549	17 44 9.3	10.448	22	22 17 19.41	1.7944	8 20 3.1	12.762
23	20 49 49.54	1.9512	S. 17 33 40.4	10.515	23	22 19 7.02	1.7926	S. 8 7 16.5	12.792
SATURDAY 14.					MONDAY 16.				
0	20 51 46.47	1.9466	S. 17 23 7.5	10.581	0	22 20 54.52	1.7908	S. 7 54 28.1	12.821
1	20 53 43.12	1.9419	17 12 30.6	10.647	1	22 22 41.02	1.7891	7 41 38.0	12.850
2	20 55 39.50	1.9374	17 1 49.9	10.711	2	22 24 29.21	1.7876	7 28 46.1	12.878
3	20 57 35.61	1.9329	16 51 5.3	10.774	3	22 26 16.41	1.7860	7 15 52.6	12.905
4	20 59 31.45	1.9284	16 40 17.0	10.837	4	22 28 3.52	1.7844	7 2 57.5	12.932
5	21 1 27.02	1.9240	16 29 24.9	10.899	5	22 29 50.54	1.7829	6 50 0.8	12.959
6	21 3 22.33	1.9197	16 18 29.1	10.960	6	22 31 37.47	1.7815	6 37 2.5	12.984
7	21 5 17.38	1.9154	16 7 29.7	11.020	7	22 33 24.32	1.7802	6 24 2.7	13.009
8	21 7 12.18	1.9111	15 56 26.7	11.079	8	22 35 11.10	1.7790	6 11 1.4	13.033
9	21 9 6.72	1.9069	15 45 20.1	11.136	9	22 36 57.80	1.7778	5 57 58.7	13.056
10	21 11 1.01	1.9028	15 34 10.1	11.192	10	22 38 44.44	1.7767	5 44 54.7	13.079
11	21 12 55.05	1.8987	15 22 56.6	11.242	11	22 40 31.02	1.7757	5 31 49.3	13.101
12	21 14 48.65	1.8947	15 11 39.8	11.298	12	22 42 17.53	1.7747	5 18 42.6	13.122
13	21 16 42.41	1.8907	15 0 19.6	11.354	13	22 44 3.99	1.7738	5 5 34.7	13.143
14	21 18 35.74	1.8868	14 48 56.1	11.418	14	22 45 50.39	1.7730	4 52 25.5	13.163
15	21 20 28.83	1.8830	14 37 29.4	11.472	15	22 47 36.74	1.7722	4 39 15.2	13.182
16	21 22 21.70	1.8792	14 25 59.5	11.525	16	22 49 23.05	1.7715	4 26 3.7	13.201
17	21 24 14.34	1.8755	14 14 26.4	11.577	17	22 51 9.32	1.7708	4 12 51.1	13.219
18	21 26 6.76	1.8718	14 2 50.3	11.628	18	22 52 55.55	1.7703	3 59 37.4	13.236
19	21 27 58.96	1.8682	13 51 11.1	11.678	19	22 54 41.75	1.7698	3 46 22.7	13.253
20	21 29 50.94	1.8647	13 39 28.9	11.726	20	22 56 27.92	1.7694	3 33 7.1	13.269
21	21 31 42.71	1.8612	13 27 43.7	11.772	21	22 58 14.07	1.7690	3 19 50.5	13.284
22	21 33 34.28	1.8577	13 15 55.6	11.826	22	23 0 0.20	1.7687	3 6 33.0	13.298
23	21 35 25.64	1.8543	13 4 4.7	11.873	23	23 1 46.31	1.7684	2 53 14.7	13.312
24	21 37 16.80	1.8510	S. 12 52 10.9	11.919	24	23 3 32.41	1.7692	S. 2 39 55.6	13.326



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 17.					THURSDAY 19.				
	h. m. s.		S. O. I. N. "			h. m. s.		N. O. I. N. "	
0	23 3 32.41	1.7683	S. 2 39 55.6	13.336	0	0 29 27.85	1.8373	N. 8 1 15.6	12.100
1	23 5 18.50	1.7681	2 26 35.7	13.337	1	0 31 18.17	1.8403	8 14 20.9	12.076
2	23 7 4.58	1.7681	2 13 15.1	13.340	2	0 33 8.68	1.8433	8 27 24.7	12.061
3	23 8 50.66	1.7681	1 59 53.8	13.360	3	0 34 59.37	1.8464	8 40 27.0	12.036
4	23 10 36.75	1.7682	1 46 31.9	13.370	4	0 36 50.95	1.8496	8 53 27.7	12.998
5	23 12 22.84	1.7683	1 33 9.4	13.380	5	0 38 41.33	1.8529	9 6 26.7	12.970
6	23 14 8.95	1.7685	1 19 46.3	13.389	6	0 40 32.60	1.8563	9 19 24.1	12.941
7	23 15 55.07	1.7687	1 6 22.6	13.396	7	0 42 24.08	1.8597	9 32 19.8	12.912
8	23 17 41.20	1.7691	0 52 58.5	13.406	8	0 44 15.76	1.8632	9 45 13.6	12.881
9	23 19 27.36	1.7695	0 39 33.9	13.413	9	0 46 7.65	1.8667	9 58 5.6	12.850
10	23 21 13.54	1.7700	0 26 9.0	13.418	10	0 47 59.76	1.8703	10 10 55.6	12.818
11	23 22 59.76	1.7706	S. 0 12 43.7	13.424	11	0 49 52.08	1.8739	10 23 43.7	12.785
12	23 24 46.01	1.7713	N. 0 0 41.9	13.429	12	0 51 44.63	1.8776	10 36 29.8	12.751
13	23 26 32.30	1.7719	0 14 7.8	13.433	13	0 53 37.40	1.8813	10 49 13.8	12.716
14	23 28 18.64	1.7726	0 27 33.9	13.436	14	0 55 30.39	1.8851	11 1 55.7	12.680
15	23 30 5.02	1.7734	0 41 0.2	13.439	15	0 57 23.61	1.8890	11 14 35.4	12.643
16	23 31 51.45	1.7743	0 54 26.6	13.441	16	0 59 17.07	1.8930	11 27 12.8	12.605
17	23 33 37.94	1.7752	1 7 53.1	13.442	17	1 1 10.77	1.8970	11 39 47.9	12.566
18	23 35 24.48	1.7763	1 21 19.7	13.443	18	1 3 4.71	1.9010	11 52 20.7	12.525
19	23 37 11.09	1.7774	1 34 46.3	13.443	19	1 4 58.89	1.9051	12 4 51.0	12.484
20	23 38 57.77	1.7786	1 48 12.8	13.441	20	1 6 53.32	1.9092	12 17 18.8	12.443
21	23 40 44.52	1.7798	2 1 39.3	13.440	21	1 8 48.00	1.9134	12 29 44.1	12.400
22	23 42 31.34	1.7811	2 15 5.6	13.437	22	1 10 42.93	1.9177	12 42 6.8	12.356
23	23 44 18.24	1.7824	N. 2 28 31.8	13.434	23	1 12 38.12	1.9221	N. 12 54 26.8	12.311
WEDNESDAY 18.					FRIDAY 20.				
	h. m. s.		N. 2 41 57.7	13.430	0	1 14 33.58	1.9265	N. 13 6 44.1	12.265
1	23 47 52.30	1.7858	2 55 23.4	13.426	1	1 16 29.30	1.9309	13 18 58.6	12.218
2	23 49 39.46	1.7868	3 8 48.8	13.420	2	1 18 25.29	1.9354	13 31 10.3	12.170
3	23 51 26.72	1.7884	3 22 13.9	13.414	3	1 20 21.55	1.9399	13 43 19.0	12.121
4	23 53 14.07	1.7901	3 35 38.5	13.407	4	1 22 18.08	1.9445	13 55 24.8	12.071
5	23 55 1.53	1.7918	3 49 2.7	13.399	5	1 24 14.89	1.9491	14 7 27.6	12.020
6	23 56 49.09	1.7937	4 2 26.4	13.391	6	1 26 11.97	1.9538	14 19 27.2	11.968
7	23 58 36.77	1.7956	4 15 49.6	13.382	7	1 28 9.34	1.9586	14 31 23.7	11.914
8	0 0 24.56	1.7975	4 29 12.2	13.372	8	1 30 7.00	1.9634	14 43 16.9	11.859
9	0 2 12.46	1.7994	4 42 34.2	13.361	9	1 32 4.95	1.9682	14 55 6.8	11.804
10	0 4 0.49	1.8015	4 55 55.5	13.349	10	1 34 3.19	1.9731	15 6 53.4	11.747
11	0 5 48.65	1.8037	5 9 16.1	13.337	11	1 36 1.72	1.9780	15 18 36.5	11.689
12	0 7 36.93	1.8059	5 22 35.9	13.323	12	1 38 0.55	1.9830	15 30 16.2	11.633
13	0 9 25.35	1.8081	5 35 54.9	13.309	13	1 39 59.68	1.9880	15 41 52.3	11.573
14	0 11 13.90	1.8104	5 49 13.0	13.294	14	1 41 59.11	1.9931	15 53 24.8	11.510
15	0 13 2.59	1.8127	6 2 30.2	13.279	15	1 43 58.85	1.9982	16 4 53.6	11.448
16	0 14 51.43	1.8152	6 15 46.5	13.262	16	1 45 58.90	2.0033	16 16 18.6	11.385
17	0 16 40.42	1.8177	6 29 1.7	13.245	17	1 47 59.25	2.0085	16 27 39.8	11.322
18	0 18 29.56	1.8203	6 42 15.9	13.227	18	1 49 59.92	2.0138	16 38 57.2	11.257
19	0 20 18.86	1.8230	6 55 28.9	13.208	19	1 52 0.91	2.0191	16 50 10.6	11.190
20	0 22 8.32	1.8257	7 8 40.8	13.188	20	1 54 2.21	2.0244	17 1 20.0	11.122
21	0 23 57.95	1.8285	7 21 51.4	13.167	21	1 56 3.83	2.0298	17 12 25.3	11.053
22	0 25 47.74	1.8313	7 35 0.8	13.145	22	1 58 5.78	2.0352	17 23 26.4	10.983
23	0 27 37.71	1.8342	7 48 8.9	13.123	23	2 0 8.05	2.0406	17 34 23.3	10.912
24	0 29 27.85	1.8372	N. 8 1 15.6	13.100	24	2 2 10.65	2.0461	N. 17 45 15.8	10.840



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 21.					MONDAY 23.				
0	2 2 10.65	2.0461	N.17 45 15.8	10.840	0	3 46 59.99	2.3300	N.24 39 28.1	5.368
1	2 4 13.58	2.0616	17 56 4.0	10.765	1	3 49 19.34	2.3263	24 45 21.7	5.327
2	2 6 16.84	2.0671	18 6 47.7	10.691	2	3 51 39.01	2.3204	24 51 7.4	5.285
3	2 8 20.43	2.0696	18 17 26.9	10.616	3	3 53 58.99	2.3266	24 56 45.1	5.262
4	2 10 24.35	2.0692	18 28 1.6	10.589	4	3 56 19.27	2.3406	25 2 14.9	5.438
5	2 12 28.61	2.0738	18 38 31.6	10.461	5	3 58 39.86	2.3466	25 7 36.6	5.294
6	2 14 33.21	2.0736	18 48 56.9	10.381	6	4 1 0.74	2.3606	25 12 50.2	5.168
7	2 16 38.15	2.0682	18 59 17.3	10.300	7	4 3 21.92	2.3668	25 17 55.6	5.021
8	2 18 43.43	2.0600	19 9 32.9	10.218	8	4 5 43.38	2.3601	25 22 52.7	4.983
9	2 20 49.05	2.0506	19 19 43.6	10.136	9	4 8 5.13	2.3648	25 27 41.6	4.745
10	2 22 55.02	2.1023	19 29 49.2	10.062	10	4 10 27.16	2.3695	25 32 22.1	4.606
11	2 25 1.33	2.1081	19 39 49.7	9.986	11	4 12 49.47	2.3741	25 36 54.2	4.464
12	2 27 7.99	2.1139	19 49 45.1	9.979	12	4 15 12.05	2.3786	25 41 17.8	4.322
13	2 29 15.00	2.1197	19 59 35.3	9.792	13	4 17 34.90	2.3830	25 45 32.9	4.180
14	2 31 22.35	2.1266	20 9 20.1	9.708	14	4 19 58.01	2.3874	25 49 39.4	4.037
15	2 33 30.05	2.1313	20 18 59.6	9.612	15	4 22 21.38	2.3917	25 53 37.3	3.893
16	2 35 38.10	2.1371	20 28 33.6	9.520	16	4 24 45.01	2.3966	25 57 26.5	3.747
17	2 37 46.50	2.1430	20 38 2.1	9.428	17	4 27 8.88	2.3999	26 1 6.9	3.600
18	2 39 55.36	2.1488	20 47 25.0	9.334	18	4 29 33.00	2.4038	26 4 38.5	3.453
19	2 42 4.36	2.1547	20 56 42.2	9.239	19	4 31 57.35	2.4078	26 8 1.3	3.306
20	2 44 13.82	2.1606	21 5 53.7	9.143	20	4 34 21.94	2.4117	26 11 15.2	3.167
21	2 46 23.63	2.1665	21 14 59.4	9.046	21	4 36 46.76	2.4155	26 14 20.1	3.008
22	2 48 33.80	2.1724	21 23 59.2	8.947	22	4 39 11.80	2.4191	26 17 16.1	2.856
23	2 50 44.32	2.1782	N.21 32 53.0	8.847	23	4 41 37.05	2.4227	N.26 20 3.1	2.707
SUNDAY 22.					TUESDAY 24.				
0	2 52 55.19	2.1841	N.21 41 40.8	8.746	0	4 44 2.52	2.4261	N.26 22 41.0	2.566
1	2 55 6.41	2.1900	21 50 22.5	8.643	1	4 46 28.19	2.4296	26 25 9.8	2.408
2	2 57 17.99	2.1969	21 58 58.0	8.580	2	4 48 54.06	2.4327	26 27 29.4	2.260
3	2 59 29.92	2.2018	22 7 27.2	8.484	3	4 51 20.12	2.4369	26 29 39.8	2.097
4	3 1 42.20	2.2076	22 15 50.1	8.388	4	4 53 46.37	2.4390	26 31 41.0	1.943
5	3 3 54.84	2.2135	22 24 6.6	8.291	5	4 56 12.80	2.4420	26 33 32.9	1.787
6	3 6 7.82	2.2193	22 32 16.6	8.112	6	4 58 39.41	2.4449	26 35 15.5	1.631
7	3 8 21.15	2.2251	22 40 20.1	8.002	7	5 1 6.19	2.4477	26 36 48.7	1.476
8	3 10 34.83	2.2309	22 48 16.9	7.891	8	5 3 33.13	2.4508	26 38 12.5	1.318
9	3 12 48.86	2.2367	22 56 7.0	7.779	9	5 6 0.23	2.4528	26 39 26.9	1.161
10	3 15 3.23	2.2425	23 3 56.4	7.666	10	5 8 27.47	2.4562	26 40 31.8	1.004
11	3 17 17.95	2.2482	23 11 26.9	7.562	11	5 10 54.86	2.4576	26 41 27.3	0.846
12	3 19 33.02	2.2540	23 18 56.6	7.436	12	5 13 22.38	2.4597	26 42 13.3	0.687
13	3 21 48.43	2.2597	23 26 19.3	7.319	13	5 15 50.03	2.4618	26 42 49.7	0.528
14	3 24 4.18	2.2654	23 33 34.9	7.201	14	5 18 17.80	2.4638	26 43 16.6	0.369
15	3 26 20.27	2.2710	23 40 43.4	7.082	15	5 20 45.69	2.4657	26 43 33.9	0.209
16	3 28 36.70	2.2766	23 47 44.7	6.961	16	5 23 13.69	2.4675	26 43 41.7	0.049
17	3 30 53.46	2.2822	23 54 38.7	6.839	17	5 25 41.79	2.4692	26 43 39.8	0.112
18	3 33 10.56	2.2877	24 1 25.4	6.717	18	5 28 9.99	2.4707	26 43 26.3	0.273
19	3 35 27.99	2.2933	24 8 4.7	6.593	19	5 30 38.27	2.4721	26 43 7.1	0.434
20	3 37 45.74	2.2987	24 14 36.6	6.468	20	5 33 6.64	2.4733	26 42 36.2	0.595
21	3 40 3.82	2.3041	24 21 1.0	6.342	21	5 35 35.08	2.4745	26 41 55.6	0.757
22	3 42 22.23	2.3094	24 27 17.7	6.215	22	5 38 3.58	2.4756	26 41 5.4	0.919
23	3 44 40.95	2.3147	24 33 26.7	6.087	23	5 40 32.15	2.4768	26 40 5.4	1.081
24	3 46 59.99	2.3200	N.24 39 28.1	5.958	24	5 43 0.77	2.4775	N.26 38 55.7	1.243



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 25.					FRIDAY 27.				
0	5 43 0.77	2.4776	N.26 38 55.7	1.943	0	7 40 53.61	2.4002	N.22 35 50.2	8.706
1	5 45 29.44	2.4782	26 37 36.3	1.406	1	7 43 17.52	2.3998	22 27 3.7	8.844
2	5 47 58.15	2.4788	26 36 7.1	1.867	2	7 45 41.92	2.3994	22 18 8.9	8.983
3	5 50 26.89	2.4798	26 34 28.2	1.739	3	7 48 4.72	2.3989	22 9 5.8	9.121
4	5 53 55.66	2.4796	26 32 39.6	1.592	4	7 50 28.01	2.3984	21 59 54.4	9.257
5	5 55 24.45	2.4799	26 30 41.2	2.065	5	7 52 51.09	2.3988	21 50 34.9	9.393
6	5 57 53.25	2.4801	26 28 33.0	2.317	6	7 55 13.95	2.3798	21 41 7.3	9.527
7	6 0 22.06	2.4802	26 26 15.1	2.379	7	7 57 36.60	2.3787	21 31 31.7	9.660
8	6 2 50.87	2.4801	26 23 47.5	2.542	8	7 59 59.04	2.3731	21 21 48.1	9.792
9	6 5 19.67	2.4798	26 21 10.1	2.705	9	8 2 21.26	2.3684	21 11 56.6	9.924
10	6 7 48.45	2.4795	26 18 22.9	2.967	10	8 4 43.25	2.3648	21 1 57.2	10.054
11	6 10 17.21	2.4792	26 15 26.1	3.028	11	8 7 5.02	2.3611	20 51 50.1	10.188
12	6 12 45.95	2.4787	26 12 19.5	3.190	12	8 9 26.58	2.3574	20 41 35.3	10.310
13	6 15 14.65	2.4791	26 9 3.2	3.352	13	8 11 47.92	2.3537	20 31 12.8	10.437
14	6 17 43.32	2.4774	26 5 37.2	3.512	14	8 14 9.03	2.3500	20 20 42.8	10.568
15	6 20 11.94	2.4765	26 2 1.8	3.674	15	8 16 29.92	2.3462	20 10 5.2	10.698
16	6 22 40.50	2.4766	25 58 16.3	3.838	16	8 18 50.58	2.3426	19 59 20.2	10.812
17	6 25 9.00	2.4745	25 54 21.4	3.996	17	8 21 11.02	2.3387	19 48 27.8	10.925
18	6 27 37.44	2.4734	25 50 16.8	4.157	18	8 23 31.23	2.3340	19 37 28.0	11.036
19	6 30 5.81	2.4732	25 46 2.6	4.317	19	8 25 51.22	2.3318	19 26 21.0	11.176
20	6 32 34.10	2.4708	25 41 38.8	4.476	20	8 28 10.99	2.3276	19 15 6.9	11.296
21	6 35 2.30	2.4698	25 37 5.5	4.636	21	8 30 30.53	2.3238	19 3 45.7	11.412
22	6 37 30.42	2.4678	25 32 22.6	4.794	22	8 32 49.85	2.3200	18 52 17.4	11.529
23	6 39 58.44	2.4662	N.25 27 30.2	4.952	23	8 35 8.94	2.3168	N.18 40 42.2	11.644
THURSDAY 26.					SATURDAY 28.				
0	6 42 26.36	2.4646	N.25 22 28.3	5.110	0	8 37 27.81	2.3126	N.18 29 0.1	11.768
1	6 44 54.18	2.4627	25 17 17.0	5.267	1	8 39 46.46	2.3087	18 17 11.2	11.871
2	6 47 21.88	2.4608	25 11 56.2	5.424	2	8 42 4.88	2.3048	18 5 15.6	11.969
3	6 49 49.47	2.4588	25 6 26.0	5.581	3	8 44 23.08	2.3016	17 53 13.4	12.092
4	6 52 16.93	2.4567	25 0 46.5	5.737	4	8 46 41.07	2.2979	17 41 4.6	12.200
5	6 54 44.27	2.4546	24 54 57.6	5.892	5	8 48 58.84	2.2942	17 28 49.3	12.308
6	6 57 11.47	2.4522	24 48 59.5	6.047	6	8 51 16.39	2.2907	17 16 27.6	12.415
7	6 59 38.54	2.4499	24 42 52.1	6.201	7	8 53 33.72	2.2871	17 3 59.5	12.520
8	7 2 5.46	2.4475	24 36 35.4	6.354	8	8 55 50.84	2.2835	16 51 25.2	12.624
9	7 4 32.24	2.4451	24 30 9.5	6.507	9	8 58 7.75	2.2800	16 38 44.7	12.726
10	7 6 58.87	2.4425	24 23 34.5	6.659	10	9 0 24.44	2.2765	16 25 58.1	12.827
11	7 9 25.34	2.4399	24 16 50.4	6.810	11	9 2 40.93	2.2731	16 13 5.4	12.927
12	7 11 51.66	2.4372	24 9 57.3	6.961	12	9 4 57.21	2.2696	16 0 6.8	13.026
13	7 14 17.81	2.4345	24 2 55.1	7.111	13	9 7 13.28	2.2662	15 47 2.3	13.128
14	7 16 43.80	2.4316	23 55 44.0	7.260	14	9 9 29.15	2.2628	15 33 52.0	13.219
15	7 19 9.61	2.4287	23 48 23.9	7.408	15	9 11 44.82	2.2595	15 20 36.0	13.313
16	7 21 35.25	2.4257	23 40 55.0	7.555	16	9 14 0.29	2.2562	15 7 14.4	13.406
17	7 24 0.71	2.4227	23 33 17.2	7.702	17	9 16 15.56	2.2529	14 53 47.2	13.499
18	7 26 25.98	2.4197	23 25 30.7	7.847	18	9 18 30.64	2.2497	14 40 14.5	13.590
19	7 28 51.07	2.4166	23 17 35.5	7.992	19	9 20 45.52	2.2465	14 26 36.4	13.679
20	7 31 15.97	2.4134	23 9 31.6	8.136	20	9 23 0.22	2.2434	14 12 53.0	13.767
21	7 33 40.68	2.4102	23 1 19.1	8.280	21	9 25 14.73	2.2403	13 59 4.4	13.853
22	7 36 5.19	2.4069	22 52 58.0	8.423	22	9 27 29.06	2.2372	13 45 10.6	13.938
23	7 38 29.50	2.4035	22 44 28.3	8.566	23	9 29 43.21	2.2342	13 31 11.8	14.022
24	7 40 53.61	2.4002	N.22 35 50.2	8.706	24	9 31 57.18	2.2312	N.13 17 8.0	14.104



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 29.					MONDAY 30.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	9 31 57.18	2.2313	N. 13 17 8.0	14.104	0	10 24 47.67	2.1781	N. 7 18 22.9	15.653
1	9 34 10.97	2.2284	13 2 59.3	14.186	1	10 26 58.33	2.1787	7 2 42.3	15.699
2	9 36 24.59	2.2366	12 48 45.8	14.264	2	10 29 8.88	2.1784	6 46 59.0	15.744
3	9 38 36.04	2.2226	12 34 27.6	14.343	3	10 31 19.37	2.1742	6 31 13.1	15.787
4	9 40 51.33	2.2200	12 20 4.7	14.419	4	10 33 29.78	2.1720	6 15 24.6	15.828
5	9 43 4.45	2.2178	12 5 37.2	14.486	5	10 35 40.13	2.1719	5 59 33.7	15.868
6	9 45 17.41	2.2147	11 51 5.3	14.540	6	10 37 50.41	2.1709	5 43 40.4	15.907
7	9 47 30.22	2.2122	11 36 29.0	14.642	7	10 40 0.63	2.1699	5 27 44.8	15.944
8	9 49 42.87	2.2097	11 21 48.3	14.713	8	10 42 10.80	2.1690	5 11 47.1	15.980
9	9 51 55.38	2.2072	11 7 3.4	14.782	9	10 44 20.92	2.1682	4 55 47.2	16.014
10	9 54 7.74	2.2046	10 52 14.4	14.846	10	10 46 30.99	2.1675	4 39 45.4	16.046
11	9 56 19.96	2.2026	10 37 21.4	14.917	11	10 48 41.02	2.1668	4 23 41.7	16.078
12	9 58 32.04	2.2002	10 22 24.4	14.988	12	10 50 51.01	2.1663	4 7 36.1	16.107
13	10 0 43.98	2.1980	10 7 23.5	15.046	13	10 53 0.97	2.1658	3 51 28.8	16.135
14	10 2 55.80	2.1949	9 52 18.9	15.108	14	10 55 10.91	2.1654	3 35 19.9	16.161
15	10 5 7.49	2.1926	9 37 10.5	15.170	15	10 57 20.82	2.1650	3 19 9.5	16.186
16	10 7 19.06	2.1916	9 21 58.5	15.229	16	10 59 30.71	2.1648	3 2 57.6	16.209
17	10 9 30.51	2.1899	9 6 43.0	15.287	17	11 1 40.59	2.1646	2 46 44.4	16.231
18	10 11 41.85	2.1880	8 51 24.0	15.344	18	11 3 50.46	2.1645	2 30 29.9	16.251
19	10 13 53.07	2.1862	8 36 1.7	15.399	19	11 6 0.33	2.1644	2 14 14.3	16.269
20	10 16 4.19	2.1845	8 20 36.1	15.452	20	11 8 10.19	2.1644	1 57 57.6	16.286
21	10 18 15.20	2.1826	8 5 7.3	15.506	21	11 10 20.06	2.1645	1 41 39.9	16.302
22	10 20 26.12	2.1812	7 49 35.5	15.556	22	11 12 29.93	2.1647	1 25 21.4	16.315
23	10 22 36.94	2.1795	7 34 0.7	15.605	23	11 14 39.82	2.1650	1 9 2.1	16.327
24	10 24 47.67	2.1781	N. 7 18 22.9	15.653	24	11 16 49.73	2.1654	N. 0 52 42.2	16.338

PHASES OF THE MOON.

	Day. h. m.
○ Full Moon, . . . . .	5 10 0.0
☾ Last Quarter, . . . . .	19 13 34.5
● New Moon, . . . . .	20 17 44.8
☾ First Quarter, . . . . .	28 2 36.2

	Day. h.
☾ Perigee, . . . . .	3 23.5
☾ Apogee, . . . . .	16 2.5



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
1	SUN W.	118 45 54	2583	120 26 22	2620	122 7 8	2608	123 48 10	2496
	Venus W.	76 53 45	2569	78 33 22	2556	80 13 17	2543	81 53 31	2530
	Aldebaran W.	63 2 0	2367	64 48 18	2373	66 34 57	2258	68 21 58	2245
	Jupiter W.	24 49 40	2235	26 37 15	2222	28 25 10	2208	30 13 25	2196
	Pollux W.	20 34 50	2239	22 19 53	2207	24 5 42	2280	25 52 11	2256
	Spica E.	71 9 21	2212	69 21 12	2200	67 32 45	2188	65 43 59	2176
2	Venus W.	90 19 1	2471	92 0 55	2460	93 43 4	2430	95 25 27	2441
	Aldebaran W.	77 21 47	2186	79 10 37	2174	80 59 43	2166	82 49 3	2156
	Jupiter W.	39 19 3	2141	41 8 59	2132	42 59 10	2122	44 49 35	2112
	Pollux W.	34 52 19	2168	36 41 35	2158	38 31 13	2141	40 21 9	2120
	Spica E.	56 35 58	2134	54 45 35	2116	52 54 59	2107	51 4 10	2089
	Antares E.	102 22 57	2116	100 32 23	2107	98 41 35	2098	96 50 33	2080
3	Venus W.	104 0 25	2408	105 43 55	2396	107 27 33	2382	109 11 18	2368
	Jupiter W.	54 4 42	2079	55 56 13	2074	57 47 52	2060	59 39 39	2065
	Pollux W.	49 34 49	2085	51 26 11	2078	53 17 44	2073	55 9 26	2067
	Saturn W.	21 2 23	2072	22 54 3	2064	24 45 58	2067	26 38 4	2050
	Spica E.	41 47 19	2086	39 55 30	2064	38 3 35	2080	36 11 34	2066
	Antares E.	87 32 25	2085	85 40 17	2061	83 48 2	2046	81 55 39	2042
	Mars E.	115 53 49	2212	114 5 41	2206	112 17 25	2202	110 29 1	2196
4	Jupiter W.	68 59 41	2067	70 51 47	2066	72 43 54	2067	74 35 58	2059
	Pollux W.	64 29 28	2068	66 21 39	2063	68 13 50	2054	70 6 0	2054
	Saturn W.	36 0 26	2085	37 53 6	2085	39 45 46	2085	41 38 26	2035
	Regulus W.	27 27 45	2046	29 20 8	2046	31 12 32	2044	33 4 57	2044
	Antares E.	72 32 36	2083	70 39 53	2083	68 47 11	2034	66 54 30	2085
	Mars E.	101 25 44	2187	99 36 57	2188	97 46 11	2198	95 59 25	2188
5	Jupiter W.	83 55 23	2078	85 46 56	2084	87 38 20	2091	89 29 33	2098
	Pollux W.	79 26 6	2072	81 17 49	2077	83 9 24	2068	85 0 49	2080
	Saturn W.	51 1 2	2062	52 53 15	2067	54 45 20	2064	56 37 15	2071
	Regulus W.	42 26 26	2061	44 18 26	2065	46 10 19	2072	48 2 2	2078
	Antares E.	57 32 0	2064	55 39 50	2069	53 47 48	2066	51 55 57	2073
	Mars E.	86 56 28	2207	85 8 11	2212	83 20 3	2220	81 32 5	2227
6	Jupiter W.	98 42 36	2143	100 32 29	2155	102 22 4	2167	104 11 22	2178
	Saturn W.	65 53 47	2116	67 44 22	2126	69 34 41	2138	71 24 42	2150
	Regulus W.	57 17 39	2122	59 8 4	2134	60 58 12	2145	62 48 3	2157
	Antares E.	42 39 44	2118	40 49 13	2130	38 58 59	2141	37 9 2	2153
	Mars E.	72 35 16	2273	70 48 37	2285	69 2 15	2297	67 16 11	2269
	$\alpha$ Aquilæ E.	96 34 40	2748	94 59 4	2766	93 23 38	2763	91 46 24	2777
7	Saturn W.	80 29 59	2218	82 18 0	2233	84 5 39	2249	85 52 54	2264
	Regulus W.	71 52 32	2224	73 40 24	2239	75 27 53	2255	77 14 59	2271
	Mars E.	58 30 36	2280	56 46 32	2294	55 2 49	2410	53 19 29	2427
	$\alpha$ Aquilæ E.	83 56 29	2864	82 23 11	2878	80 50 18	2896	79 17 53	2920
	Fomalhaut E.	108 39 50	2624	107 1 27	2631	105 23 14	2640	103 45 13	2649
8	Saturn W.	94 43 13	2348	96 28 2	2366	98 12 26	2383	99 56 25	2402
	Regulus W.	86 4 33	2354	87 49 14	2371	89 33 30	2389	91 17 20	2407
	Spica W.	32 4 35	2368	33 48 55	2384	35 32 52	2401	37 16 25	2417
	Mars E.	44 48 49	2614	43 7 55	2623	41 27 27	2651	39 47 24	2570
	$\alpha$ Aquilæ E.	71 43 53	2660	70 14 54	2692	68 46 35	2726	67 18 59	2765
	Fomalhaut E.	95 38 58	2716	94 2 39	2732	92 26 41	2749	90 51 6	2766



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
1	Sun W.	125 29 29	2488	127 11 4	2474	128 52 54	2483	130 34 59	2455
	Venus W.	83 34 3	2517	85 14 52	2506	86 55 58	2498	88 37 21	2481
	Aldebaran W.	70 9 18	2522	71 56 57	2519	73 44 57	2508	75 33 13	2496
	Jupiter W.	32 1 58	2484	33 50 49	2478	35 39 57	2462	37 29 22	2451
	Pollux W.	27 39 15	2526	29 26 51	2516	31 14 54	2498	33 3 24	2492
	Spica E.	63 54 55	2486	62 5 34	2466	60 15 58	2444	58 26 6	2434
2	Venus W.	97 8 3	2482	98 50 52	2424	100 33 52	2416	102 17 4	2410
	Aldebaran W.	84 38 37	2448	86 28 23	2439	88 18 22	2433	90 8 31	2426
	Jupiter W.	46 40 14	2468	48 31 4	2466	50 22 6	2461	52 13 19	2466
	Pollux W.	42 11 23	2449	44 1 53	2460	45 52 38	2460	47 43 37	2462
	Spica E.	40 13 9	2491	47 21 56	2485	45 30 33	2478	43 39 0	2473
	Antares E.	94 59 18	2482	93 7 51	2474	91 16 12	2468	89 24 24	2462
3	Venus W.	110 55 10	2488	112 39 6	2492	114 23 7	2380	116 7 10	2378
	Jupiter W.	61 31 32	2482	63 23 29	2480	65 15 30	2467	67 7 35	2467
	Pollux W.	57 1 16	2462	58 53 12	2469	60 45 14	2467	62 37 19	2466
	Saturn W.	28 20 20	2466	30 22 43	2461	32 15 13	2468	34 7 48	2466
	Spica E.	34 19 30	2466	32 27 23	2465	30 35 15	2466	28 43 8	2467
	Antares E.	80 3 10	2489	78 10 37	2486	76 17 59	2465	74 25 19	2463
	Mars E.	108 40 30	2484	106 51 54	2482	105 3 14	2480	103 14 31	2487
4	Jupiter W.	76 28 1	2461	78 20 0	2464	80 11 54	2467	82 3 42	2473
	Pollux W.	71 58 10	2467	73 50 16	2469	75 42 19	2462	77 34 16	2467
	Saturn W.	43 31 6	2467	45 23 42	2460	47 16 14	2464	49 8 41	2467
	Regulus W.	34 57 22	2466	36 49 44	2468	38 42 3	2462	40 34 17	2465
	Antares E.	65 1 50	2468	63 9 15	2461	61 16 44	2464	59 24 18	2469
	Mars E.	94 10 40	2482	92 22 0	2484	90 33 24	2497	88 44 52	2502
5	Jupiter W.	91 20 36	2466	93 11 27	2474	95 2 5	2484	96 52 28	2484
	Pollux W.	86 52 3	2468	88 43 5	2464	90 33 55	2466	92 24 30	2466
	Saturn W.	58 28 59	2479	60 20 31	2466	62 11 51	2466	64 2 57	2466
	Regulus W.	49 53 35	2466	51 44 56	2464	53 36 4	2463	55 26 59	2463
	Antares E.	50 4 17	2461	48 12 48	2460	46 21 33	2468	44 30 31	2468
	Mars E.	79 44 18	2485	77 56 42	2482	76 9 19	2483	74 22 10	2483
6	Jupiter W.	106 0 22	2482	107 49 2	2494	109 37 23	2499	111 25 22	2494
	Saturn W.	73 14 25	2462	75 3 49	2476	76 52 53	2480	78 41 36	2482
	Regulus W.	64 37 36	2469	66 26 51	2482	68 15 45	2486	70 4 19	2480
	Antares E.	35 19 24	2465	33 30 4	2479	31 41 5	2468	29 52 27	2466
	Mars E.	65 30 25	2482	63 44 57	2485	61 59 49	2460	60 15 2	2464
	α Aquilæ E.	90 13 26	2478	88 38 42	2461	87 4 16	2468	85 30 11	2465
7	Saturn W.	87 39 46	2469	89 26 15	2467	91 12 19	2464	92 57 58	2461
	Regulus W.	79 1 41	2466	80 48 1	2462	82 33 57	2460	84 19 27	2467
	Mars E.	51 36 33	2442	49 54 0	2461	48 11 52	2476	46 30 8	2466
	α Aquilæ E.	77 45 59	2462	76 14 35	2470	74 43 45	2469	73 13 30	2469
	Fomalhaut E.	102 7 25	2460	100 29 52	2473	98 52 36	2467	97 15 38	2460
8	Saturn W.	101 39 57	2468	103 23 4	2486	105 5 44	2466	106 47 59	2476
	Regulus W.	93 0 45	2466	94 43 44	2442	96 26 17	2462	98 8 24	2480
	Spica W.	38 59 35	2466	40 42 20	2468	42 24 40	2470	44 6 36	2467
	Mars E.	38 7 48	2466	36 28 37	2466	34 49 53	2467	33 11 34	2467
	α Aquilæ E.	65 52 8	2464	64 26 3	2444	63 0 46	2467	61 36 19	2469
	Fomalhaut E.	99 15 53	2465	97 41 5	2464	96 6 42	2462	94 32 44	2462



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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
		° ' "		° ' "		° ' "		° ' "	
9	Saturn W.	108 29 48	2498	110 11 11	2510	111 59 10	2627	113 32 45	2645
	Regulus W.	99 50 5	2498	101 31 21	2517	103 12 11	2635	104 52 35	2653
	Spica W.	45 48 8	2505	47 29 14	2628	49 9 55	2640	50 50 12	2669
	Mars E.	31 33 44	2666	29 56 19	2686	28 19 20	2705	26 42 47	2725
	α Aquilæ E.	60 12 46	2680	58 50 7	2431	57 28 26	2484	56 7 44	2641
	Fomalhaut E.	52 59 12	2685	81 26 8	2687	79 53 32	2609	78 21 24	2681
	SUN E.	131 58 23	2680	130 25 0	2669	128 52 1	2687	127 19 25	2605
10	Spica W.	59 5 28	2647	60 43 19	2665	62 20 46	2682	63 57 50	2689
	Antares W.	13 13 34	2640	14 51 35	2667	16 29 12	2678	18 6 26	2682
	α Aquilæ E.	49 40 59	2682	48 27 21	2684	47 15 6	2654	46 4 20	2151
	Fomalhaut E.	70 48 14	2656	69 19 11	2682	67 50 40	2109	66 22 41	2126
	α Pegasi E.	91 41 10	2610	90 6 55	2628	88 33 3	2645	86 59 34	2662
	SUN E.	119 42 26	3000	118 12 13	3019	116 42 24	3037	115 12 57	3055
11	Spica W.	71 57 33	2782	73 32 25	2797	75 6 57	2811	76 41 10	2827
	Antares W.	28 6 52	2776	27 41 51	2792	29 16 30	2807	30 50 49	2822
	Fomalhaut E.	59 11 40	2822	57 47 19	2826	56 23 37	2861	55 0 36	2868
	α Pegasi E.	79 17 48	2622	77 46 35	2669	76 15 44	2667	74 45 15	2605
	SUN E.	107 51 11	3142	106 23 54	3160	104 56 57	3175	103 30 19	3192
12	Spica W.	84 27 32	2906	85 59 56	2909	87 32 3	2920	89 3 56	2923
	Antares W.	38 37 41	2901	40 10 11	2908	41 42 26	2916	43 14 25	2927
	Fomalhaut E.	48 16 33	2610	46 58 10	2661	45 40 41	2712	44 24 7	2770
	α Pegasi E.	67 18 19	2692	65 50 0	2111	64 22 4	2129	62 54 29	2145
	SUN E.	96 21 49	3266	94 56 58	3281	93 32 24	3294	92 8 6	3306
13	Spica W.	96 39 43	2985	98 10 14	2985	99 40 33	3004	101 10 41	3012
	Antares W.	50 50 45	2981	52 21 22	2990	53 51 47	2996	55 22 2	3006
	Mars W.	17 32 6	2178	18 58 41	2185	20 25 8	2192	21 51 27	2198
	α Pegasi E.	55 41 55	2237	54 16 30	2255	52 51 27	2276	51 26 48	2296
	SUN E.	85 10 7	2955	83 47 10	2975	82 24 25	2985	81 1 51	2998
14	Antares W.	62 50 53	3042	64 20 14	3047	65 49 29	3062	67 18 38	3067
	Mars W.	29 1 18	3222	30 26 53	3223	31 52 13	3237	33 17 38	3242
	α Pegasi E.	44 29 40	3410	43 7 35	3428	41 46 1	3465	40 24 58	3497
	SUN E.	74 11 26	3422	72 49 46	3428	71 28 13	3445	70 6 47	3460
15	Antares W.	74 43 4	3078	76 11 47	3078	77 40 26	3077	79 9 5	3078
	Mars W.	40 23 37	3257	41 48 39	3259	43 13 39	3269	44 38 39	3280
	SUN E.	63 20 56	3471	61 59 59	3472	60 39 4	3474	59 18 11	3478
16	Antares W.	86 32 3	3078	88 0 39	3077	89 29 17	3075	90 57 57	3073
	Mars W.	51 43 30	3259	53 8 30	3257	54 33 32	3255	55 58 26	3252
	α Aquilæ W.	42 23 57	2746	43 24 18	2683	44 25 57	2669	45 28 49	2652
	SUN E.	52 34 15	3480	51 13 29	3480	49 52 43	3460	48 31 57	3479
17	Antares W.	98 22 1	3059	99 51 1	3055	101 20 6	3061	102 49 16	3046
	Mars W.	63 4 48	3236	64 30 15	3222	65 55 46	3227	67 21 23	3228
	α Aquilæ W.	50 58 41	2186	52 7 21	2187	53 16 47	2090	54 26 58	2047
	SUN E.	41 47 44	3472	40 26 49	3470	39 5 51	3467	37 44 50	3465
18	Mars W.	74 31 1	3194	75 57 17	3188	77 23 41	3182	78 50 19	3174
	α Aquilæ W.	60 27 36	2670	61 41 26	2641	62 55 46	2612	64 10 36	2585
	SUN E.	30 59 11	3487	29 37 59	3456	28 16 45	3456	26 55 32	3457



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Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
9	Saturn W.	115 12 55	2663	116 52 41	2679	118 32 5	2696	120 11 7	2610
	Regulus W.	106 32 34	2672	108 12 7	2690	109 51 16	2699	111 29 59	2627
	Spica W.	52 30 4	2677	54 9 31	2694	55 48 34	2612	57 27 13	2629
	Mars E.	25 6 41	2746	23 31 2	2768	21 55 50	2787	20 21 5	2807
	$\alpha$ Aquilæ E.	54 48 5	2602	53 29 33	2695	52 12 9	2731	50 55 55	2806
	Fomalhaut E.	76 49 45	2664	75 18 36	2680	73 47 58	2604	72 17 50	2630
	SUN E.	125 47 13	2626	124 15 26	2644	122 44 3	2662	121 13 3	2681
10	Spica W.	65 34 31	2716	67 10 49	2733	68 46 45	2749	70 22 20	2766
	Antares W.	19 43 17	2710	21 19 44	2726	22 55 49	2743	24 31 32	2760
	$\alpha$ Aquilæ E.	44 55 7	2600	43 47 28	2608	42 41 32	2489	41 37 31	2419
	Fomalhaut E.	64 55 18	2168	63 28 29	2197	62 2 16	2227	60 36 39	2259
	$\alpha$ Pegasi E.	85 26 27	2691	83 53 44	2698	82 21 23	2616	80 49 24	2684
	SUN E.	113 43 52	2678	112 15 9	2691	110 46 49	2109	109 18 50	2125
11	Spica W.	78 15 3	2842	79 48 37	2865	81 21 53	2889	82 54 51	2888
	Antares W.	32 24 48	2898	33 58 27	2900	35 31 50	2864	37 4 55	2879
	Fomalhaut E.	53 38 17	2437	52 16 42	2476	50 55 51	2618	49 35 47	2364
	$\alpha$ Pegasi E.	73 15 8	2622	71 45 23	2640	70 16 0	2658	68 46 59	2674
	SUN E.	102 4 0	2609	100 38 1	2624	99 12 20	2639	97 46 56	2653
12	Spica W.	90 35 33	2944	92 6 56	2965	93 38 5	2986	95 9 0	2976
	Antares W.	44 46 9	2929	46 17 38	2930	47 48 53	2960	49 19 56	2971
	Fomalhaut E.	43 8 34	2622	41 54 5	2698	40 40 42	2698	39 28 31	2643
	$\alpha$ Pegasi E.	61 27 14	2164	60 0 22	2183	58 33 52	2199	57 7 42	2219
	SUN E.	90 44 2	2819	89 20 13	2822	87 56 38	2843	86 33 16	2864
13	Spica W.	102 40 39	3020	104 10 27	3028	105 40 5	3034	107 9 35	3041
	Antares W.	56 52 7	2915	58 22 1	2922	59 51 47	2929	61 21 24	2935
	Mars W.	23 17 38	2206	24 43 41	2211	26 9 37	2217	27 35 26	2222
	$\alpha$ Pegasi E.	50 2 32	2317	48 38 40	2329	47 15 14	2362	45 52 14	2385
	SUN E.	79 39 27	2402	78 17 13	2411	76 55 9	2418	75 33 13	2436
14	Antares W.	68 47 46	3061	70 16 37	3066	71 45 30	3068	73 14 19	3071
	Mars W.	34 42 56	2245	36 8 14	2249	37 33 25	2253	38 58 32	2264
	$\alpha$ Pegasi E.	39 4 30	2630	37 44 39	2664	36 25 26	2696	35 6 58	2649
	SUN E.	68 45 27	2454	67 24 12	2459	66 3 2	2463	64 41 57	2467
15	Antares W.	80 37 41	3078	82 6 17	3079	83 34 52	3079	85 3 27	3079
	Mars W.	46 3 37	2361	47 28 34	2380	48 53 32	2359	50 18 31	2359
	SUN E.	57 57 22	2479	56 36 34	2480	55 15 47	2480	53 55 1	2480
16	Antares W.	92 26 39	3071	93 55 24	3068	95 24 13	3065	96 53 5	3062
	Mars W.	57 23 44	2230	58 48 54	2247	60 14 8	2243	61 39 26	2240
	$\alpha$ Aquilæ W.	46 32 48	2420	47 37 51	2454	48 43 53	2425	49 50 50	2427
	SUN E.	47 11 9	2478	45 50 20	2477	44 29 30	2475	43 8 38	2473
17	Antares W.	104 18 32	3042	105 47 53	3037	107 17 20	3032	108 46 53	3026
	Mars W.	68 47 6	2217	70 12 55	2212	71 38 50	2206	73 4 52	2200
	$\alpha$ Aquilæ W.	55 37 51	2409	56 49 22	2409	58 1 32	2384	59 14 17	2391
	SUN E.	36 23 47	2463	35 2 41	2461	33 41 33	2459	32 20 23	2457
18	Mars W.	80 16 52	2168	81 43 40	2160	83 10 37	2163	84 37 43	2145
	$\alpha$ Aquilæ W.	65 25 54	2780	66 41 38	2726	67 57 47	2714	69 14 19	2692
	SUN E.	25 34 18	2459	24 13 8	2462	22 52 1	2467	21 31 0	2475



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Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
23	SUN	W.	26 50 49	3121	28 18 33	3105	29 46 36	3088	31 15 0	3073
	Jupiter	E.	48 9 26	2744	46 33 44	2726	44 57 51	2737	43 21 47	2719
	Pollux	E.	51 3 35	2732	49 27 38	2735	47 51 31	2719	46 15 16	2711
	Saturn	E.	79 6 1	2706	77 29 29	2699	75 52 48	2690	74 15 55	2681
	Regulus	E.	87 51 32	2704	86 14 57	2696	84 38 10	2687	83 1 12	2678
24	SUN	W.	38 41 10	3009	40 11 12	2997	41 41 28	2986	43 11 59	2974
	Jupiter	E.	35 18 35	2676	33 41 23	2687	32 3 59	2639	30 26 24	2649
	Pollux	E.	38 11 50	2686	36 34 47	2678	34 57 38	2674	33 20 23	2671
	Saturn	E.	66 8 36	2636	64 30 33	2630	62 52 19	2622	61 13 54	2613
	Regulus	E.	74 53 29	2636	73 15 21	2626	71 37 2	2617	69 58 30	2609
25	SUN	W.	50 48 6	2919	52 20 1	2909	53 52 9	2898	55 24 31	2887
	Aldebaran	W.	20 18 38	3108	21 46 38	3026	23 16 18	2956	24 47 26	2898
	Saturn	E.	52 58 52	2570	51 19 16	2562	49 39 29	2538	47 59 30	2545
	Regulus	E.	61 42 57	2556	60 3 14	2556	58 23 19	2548	56 43 13	2539
	Spica	E.	115 46 9	2556	114 6 28	2559	112 26 36	2549	110 46 31	2540
26	SUN	W.	63 9 42	2936	65 43 25	2928	67 17 21	2916	68 51 29	2904
	Aldebaran	W.	32 38 35	2706	34 15 8	2678	35 59 17	2653	37 30 0	2631
	Venus	W.	18 16 31	2640	19 50 7	2629	21 23 57	2619	22 58 0	2610
	Saturn	E.	39 36 41	2608	37 55 32	2496	36 14 13	2487	34 32 42	2480
	Regulus	E.	48 19 37	2486	46 38 18	2486	44 56 46	2478	43 15 2	2469
	Spica	E.	102 22 58	2494	100 41 37	2486	99 0 4	2477	97 18 18	2467
27	SUN	W.	75 45 35	2758	77 21 4	2744	78 56 46	2733	80 32 42	2724
	Aldebaran	W.	45 45 34	2638	47 25 54	2622	49 6 36	2607	50 47 40	2593
	Venus	W.	30 51 34	2767	32 26 58	2747	34 2 35	2738	35 38 25	2737
	Saturn	E.	26 2 25	2443	24 19 52	2438	22 37 11	2433	20 54 23	2430
	Regulus	E.	34 43 23	2428	33 0 28	2420	31 17 22	2413	29 34 4	2405
	Spica	E.	88 46 12	2423	87 3 9	2412	85 19 52	2403	83 36 22	2395
28	SUN	W.	88 35 37	2674	90 12 52	2663	91 50 19	2655	93 27 59	2646
	Aldebaran	W.	59 17 41	2429	61 0 35	2417	62 43 46	2406	64 27 12	2396
	Venus	W.	43 40 59	2678	45 18 9	2668	46 55 32	2657	48 33 10	2648
	Jupiter	W.	18 18 7	2393	20 1 52	2384	21 45 50	2374	23 30 2	2364
	Spica	E.	74 55 41	2380	73 10 54	2341	71 25 54	2332	69 40 41	2324
	Antares	E.	120 43 33	2344	118 58 37	2336	117 13 30	2326	115 28 9	2318
29	SUN	W.	101 39 26	2601	103 18 19	2593	104 57 23	2585	106 36 39	2577
	Aldebaran	W.	73 8 14	2344	74 53 9	2336	76 38 17	2326	78 23 39	2317
	Venus	W.	56 44 29	2601	58 23 22	2592	60 2 28	2583	61 41 46	2575
	Jupiter	W.	32 14 24	2330	33 59 54	2311	35 45 37	2302	37 31 31	2296
	Pollux	W.	30 43 7	2346	32 28 0	2331	34 13 15	2317	35 58 49	2305
	Spica	E.	60 51 36	2283	59 5 11	2274	57 18 34	2268	55 31 47	2260
	Antares	E.	106 38 17	2276	104 51 42	2269	103 4 55	2260	101 17 56	2252
30	SUN	W.	114 55 37	2540	116 35 54	2533	118 16 19	2529	119 56 52	2523
	Venus	W.	70 1 4	2535	71 41 28	2528	73 22 2	2522	75 2 45	2515
	Jupiter	W.	46 23 49	2360	48 10 48	2353	49 57 56	2347	51 45 14	2341
	Pollux	W.	44 50 50	2284	46 37 57	2345	48 25 17	2337	50 12 49	2330
	Saturn	W.	16 27 42	2270	18 14 26	2255	20 1 32	2243	21 48 56	2233
	Spica	E.	46 35 12	2227	44 47 25	2222	42 59 30	2216	41 11 26	2210
	Antares	E.	92 20 17	2216	90 32 14	2210	88 44 2	2204	86 55 40	2198



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
23	SUN	W.	32 43 42	3061	34 12 39	3047	35 41 53	3084	37 11 24	3022
	Jupiter	E.	41 45 32	2789	40 9 4	2701	38 32 26	2692	36 55 36	2684
	Pollux	E.	44 38 51	2705	43 2 18	2689	41 25 37	2682	39 48 47	2687
	Saturn	E.	72 38 50	2672	71 1 33	2685	69 24 6	2656	67 46 27	2647
	Regulus	E.	81 24 2	2689	79 46 41	2681	78 9 9	2632	76 31 25	2643
24	SUN	W.	44 42 44	2692	46 13 44	2692	47 44 57	2640	49 16 25	2680
	Jupiter	E.	28 48 36	2642	27 10 38	2634	25 32 29	2626	23 54 8	2616
	Pollux	E.	31 43 4	2698	30 5 41	2687	28 28 17	2689	26 50 55	2689
	Saturn	E.	59 35 17	2604	57 56 28	2606	56 17 27	2638	54 38 15	2680
	Regulus	E.	68 19 47	2600	66 40 52	2591	65 1 45	2598	63 22 27	2674
25	SUN	W.	56 57 7	2676	58 29 56	2667	60 2 57	2656	61 36 13	2645
	Aldebaran	W.	26 19 47	2646	27 53 12	2606	29 27 32	2708	31 2 42	2735
	Saturn	E.	46 19 20	2587	44 38 58	2527	42 58 23	2620	41 17 38	2612
	Regulus	E.	55 2 54	2630	53 22 23	2622	51 41 40	2513	50 0 45	2604
	Spica	E.	109 6 14	2531	107 25 44	2522	105 45 1	2513	104 4 6	2604
26	SUN	W.	69 25 52	2794	71 0 28	2784	72 35 17	2773	74 10 20	2764
	Aldebaran	W.	39 8 13	2610	40 46 55	2591	42 26 3	2572	44 5 37	2556
	Venus	W.	24 32 15	2798	26 0 45	2798	27 41 28	2778	29 16 25	2769
	Saturn	E.	32 51 0	2473	31 9 7	2468	29 27 3	2457	27 44 49	2450
	Regulus	E.	41 33 6	2461	39 50 58	2458	38 8 37	2446	36 26 6	2436
27	SUN	W.	82 8 50	2713	83 45 12	2704	85 21 47	2693	86 58 36	2684
	Aldebaran	W.	52 29 3	2480	54 10 45	2468	55 52 46	2453	57 35 6	2443
	Venus	W.	37 14 29	2716	38 50 47	2707	40 27 18	2697	42 4 2	2687
	Saturn	E.	19 11 30	2437	17 28 35	2426	15 45 40	2431	14 2 48	2429
	Regulus	E.	27 50 36	2397	26 6 57	2391	24 23 9	2384	22 39 11	2380
28	SUN	W.	81 52 40	2393	80 8 44	2377	78 24 36	2368	76 40 15	2359
	Aldebaran	W.	95 5 52	2637	96 43 57	2628	98 22 14	2618	100 0 44	2610
	Venus	W.	66 10 54	2384	67 54 52	2373	69 39 5	2363	71 23 33	2354
	Jupiter	W.	50 11 0	2638	51 49 4	2629	53 27 20	2620	55 5 48	2610
	Spica	E.	25 14 28	2356	26 59 8	2346	28 44 1	2337	30 29 7	2329
29	SUN	W.	67 55 17	2315	66 9 40	2307	64 23 50	2299	62 37 49	2291
	Antares	E.	113 42 36	2309	111 56 50	2300	110 10 51	2292	108 24 40	2284
	Aldebaran	W.	106 16 6	2668	109 55 45	2661	111 35 33	2655	113 15 30	2648
	Venus	W.	80 9 13	2310	81 54 58	2301	83 40 56	2294	85 27 4	2287
	Jupiter	W.	63 21 15	2566	65 0 56	2559	66 40 48	2551	68 20 51	2543
30	SUN	W.	39 17 37	2288	41 3 54	2281	42 50 22	2273	44 37 1	2267
	Pollux	W.	37 44 41	2294	39 30 50	2283	41 17 15	2272	43 3 55	2262
	Spica	E.	53 44 48	2233	51 57 39	2246	50 10 30	2239	48 22 51	2233
	Antares	E.	99 30 46	2245	97 43 25	2237	95 55 53	2230	94 8 10	2223
	Aldebaran	W.	121 37 33	2618	123 18 21	2613	124 59 16	2610	126 40 17	2606
30	Venus	W.	76 43 38	2610	76 24 38	2603	80 5 47	2497	81 47 4	2492
	Jupiter	W.	53 32 40	2236	55 20 14	2231	57 7 56	2225	58 55 46	2221
	Pollux	W.	52 0 32	2223	53 48 26	2216	55 36 29	2210	57 24 42	2204
	Saturn	W.	23 36 35	2223	25 24 28	2215	27 12 33	2206	29 0 50	2200
	Spica	E.	39 23 14	2206	37 34 56	2203	35 46 33	2196	33 58 3	2196
30	Antares	E.	85 7 10	2198	83 18 32	2188	81 29 46	2182	79 40 52	2178



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sideral Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		h. m. s.	s.		° ' "	"					
Tues.	1	2 35 26.44	9.547	N.15 13 51.5	45.03	15 54.04	66.09	3 5.57	0.308		
Wed.	2	2 39 15.84	9.569	15 31 44.9	44.41	15 53.81	66.17	3 12.71	0.286		
Thur.	3	2 43 5.77	9.592	15 49 23.0	43.77	15 53.58	66.25	3 19.32	0.264		
Fri.	4	2 46 56.25	9.615	16 6 45.5	43.11	15 53.36	66.33	3 25.38	0.241		
Sat.	5	2 50 47.28	9.638	16 23 52.1	42.44	15 53.13	66.41	3 30.88	0.217		
Sun.	6	2 54 38.88	9.662	16 40 42.3	41.75	15 52.91	66.49	3 35.82	0.193		
Mon.	7	2 58 31.06	9.686	16 57 16.1	41.06	15 52.69	66.57	3 40.19	0.169		
Tues.	8	3 2 23.82	9.710	17 13 33.0	40.35	15 52.47	66.65	3 43.98	0.145		
Wed.	9	3 6 17.16	9.735	17 29 32.8	39.63	15 52.25	66.74	3 47.19	0.121		
Thur.	10	3 10 11.09	9.760	17 45 15.2	38.90	15 52.03	66.83	3 49.81	0.096		
Fri.	11	3 14 5.61	9.785	18 0 39.9	38.15	15 51.82	66.91	3 51.84	0.071		
Sat.	12	3 18 0.73	9.810	18 15 46.5	37.39	15 51.61	66.99	3 53.27	0.046		
Sun.	13	3 21 56.45	9.835	18 30 34.9	36.63	15 51.40	67.07	3 54.10	0.022		
Mon.	14	3 25 52.77	9.859	18 45 4.7	35.84	15 51.19	67.15	3 54.34	0.002		
Tues.	15	3 29 49.67	9.883	18 59 15.6	35.05	15 50.99	67.23	3 54.00	0.028		
Wed.	16	3 33 47.15	9.907	19 13 7.4	34.25	15 50.80	67.31	3 53.07	0.060		
Thur.	17	3 37 45.22	9.931	19 26 39.6	33.43	15 50.61	67.39	3 51.56	0.074		
Fri.	18	3 41 43.86	9.955	19 39 51.9	32.60	15 50.42	67.47	3 49.48	0.088		
Sat.	19	3 45 43.07	9.978	19 52 44.2	31.76	15 50.23	67.55	3 46.85	0.122		
Sun.	20	3 49 42.84	10.000	20 5 16.3	30.91	15 50.05	67.63	3 43.65	0.145		
Mon.	21	3 53 43.15	10.022	20 17 27.9	30.05	15 49.88	67.71	3 39.90	0.167		
Tues.	22	3 57 43.99	10.044	20 29 18.7	29.17	15 49.71	67.79	3 35.63	0.188		
Wed.	23	4 1 45.34	10.066	20 40 48.3	28.29	15 49.54	67.86	3 30.85	0.209		
Thur.	24	4 5 47.19	10.087	20 51 56.5	27.39	15 49.38	67.93	3 25.56	0.230		
Fri.	25	4 9 49.54	10.107	21 2 43.2	26.49	15 49.22	68.00	3 19.78	0.250		
Sat.	26	4 13 52.37	10.129	21 13 8.1	25.58	15 49.07	68.07	3 13.53	0.270		
Sun.	27	4 17 55.66	10.148	21 23 11.0	24.66	15 48.92	68.14	3 6.82	0.288		
Mon.	28	4 21 59.41	10.165	21 32 51.9	23.73	15 48.77	68.20	2 59.65	0.306		
Tues.	29	4 26 3.59	10.182	21 42 10.4	22.80	15 48.64	68.26	2 52.04	0.324		
Wed.	30	4 30 8.19	10.199	21 51 6.3	21.85	15 48.50	68.32	2 44.02	0.342		
Thur.	31	4 34 13.20	10.216	21 59 39.4	20.90	15 48.37	68.38	2 35.60	0.359		
Fri.	32	4 38 18.61	10.233	N.22 7 49.5	19.94	15 48.24	68.44	2 26.77	0.376		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sideral Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time.					
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.					Diff. for 1 hour.				
		h.	m.	s.	s.	°	'				"	"			
Tues.	1	2	35	26.93	9.547	N.15	13	53.9	45.05	3	5.60	0.308	2	38	32.53
Wed.	2	2	39	16.35	9.569	15	31	47.4	44.41	3	12.73	0.286	2	42	29.08
Thur.	3	2	43	6.30	9.592	15	49	25.5	43.77	3	19.34	0.264	2	46	25.64
Fri.	4	2	46	56.80	9.615	16	6	48.0	43.11	3	25.39	0.241	2	50	22.19
Sat.	5	2	50	47.85	9.638	16	23	54.6	42.44	3	30.90	0.217	2	54	18.75
Sun.	6	2	54	39.47	9.662	16	40	44.8	41.75	3	35.83	0.193	2	58	15.30
Mon.	7	2	58	31.66	9.686	16	57	18.6	41.06	3	40.20	0.169	3	2	11.86
Tues.	8	3	2	24.42	9.710	17	13	35.5	40.35	3	44.00	0.145	3	6	8.42
Wed.	9	3	6	17.77	9.735	17	29	35.3	39.63	3	47.20	0.121	3	10	4.97
Thur.	10	3	10	11.71	9.760	17	45	17.7	38.90	3	49.82	0.096	3	14	1.53
Fri.	11	3	14	6.24	9.785	18	0	42.4	38.15	3	51.84	0.071	3	17	58.08
Sat.	12	3	18	1.36	9.810	18	15	49.0	37.39	3	53.28	0.046	3	21	54.64
Sun.	13	3	21	57.09	9.835	18	30	37.3	36.63	3	54.10	0.022	3	25	51.19
Mon.	14	3	25	53.41	9.859	18	45	7.0	35.84	3	54.34	0.002	3	29	47.75
Tues.	15	3	29	50.81	9.883	18	59	17.8	35.05	3	54.00	0.026	3	33	44.81
Wed.	16	3	33	47.79	9.907	19	13	9.5	34.25	3	53.08	0.050	3	37	40.87
Thur.	17	3	37	45.86	9.931	19	26	41.6	33.43	3	51.56	0.074	3	41	37.42
Fri.	18	3	41	44.50	9.955	19	39	53.9	32.60	3	49.48	0.098	3	45	33.98
Sat.	19	3	45	43.70	9.978	19	52	46.2	31.76	3	46.84	0.122	3	49	30.54
Sun.	20	3	49	43.46	10.000	20	5	18.2	30.91	3	43.64	0.145	3	53	27.10
Mon.	21	3	53	43.76	10.022	20	17	29.7	30.05	3	39.89	0.167	3	57	23.65
Tues.	22	3	57	44.59	10.044	20	29	20.4	29.17	3	35.62	0.188	4	1	20.21
Wed.	23	4	1	45.93	10.066	20	40	49.9	28.29	3	30.84	0.209	4	5	16.77
Thur.	24	4	5	47.77	10.087	20	51	58.0	27.39	3	25.56	0.230	4	9	13.33
Fri.	25	4	9	50.11	10.107	21	2	44.7	26.49	3	19.77	0.250	4	13	9.88
Sat.	26	4	13	52.92	10.129	21	13	9.5	25.58	3	13.52	0.270	4	17	6.44
Sun.	27	4	17	56.19	10.148	21	23	12.3	24.66	3	6.81	0.288	4	21	3.00
Mon.	28	4	21	59.92	10.165	21	32	53.1	23.73	2	59.64	0.306	4	24	59.56
Tues.	29	4	26	4.09	10.182	21	42	11.5	22.80	2	52.03	0.324	4	28	56.12
Wed.	30	4	30	8.66	10.199	21	51	7.3	21.85	2	44.01	0.342	4	32	52.67
Thur.	31	4	34	13.64	10.216	21	59	40.3	20.90	2	35.59	0.359	4	36	49.23
Fri.	32	4	38	19.03	10.233	N.22	7	50.3	19.94	2	26.76	0.376	4	40	45.79

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

THE SUN'S											
Day of the Month.	Day of the Year.	True LONGITUDE.				Diff. for 1 hour.	LATITUDE.	Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.	
		$\lambda$		$\lambda'$							
		$^{\circ}$	$'$	$^{\circ}$	$'$						
1	122	41	18	7.5	17	38.4	145.34	—0.02	0.0036091	43.6	21 17 57.53
2	123	42	16	14.9	15	45.7	145.26	0.11	.0037134	43.3	21 14 1.62
3	124	43	14	20.5	13	51.2	145.19	0.17	.0038170	43.0	21 10 5.72
4	125	44	12	24.2	11	54.7	145.12	0.19	.0039200	42.7	21 6 9.81
5	126	45	10	26.2	9	56.5	145.05	0.19	.0040224	42.5	21 2 13.90
6	127	46	8	26.5	7	56.7	144.99	0.16	.0041242	42.2	20 58 17.99
7	128	47	6	25.3	5	55.4	144.93	0.09	.0042254	41.9	20 54 22.08
8	129	48	4	22.7	3	52.6	144.87	—0.01	.0043259	41.6	20 50 26.17
9	130	49	2	18.7	1	48.4	144.81	+0.11	.0044255	41.2	20 46 30.26
10	131	49	60	13.3	59	42.8	144.75	0.24	.0045241	40.8	20 42 34.35
11	132	50	58	6.5	57	35.9	144.70	0.37	.0046217	40.3	20 38 38.44
12	133	51	55	58.5	55	27.8	144.65	0.50	.0047182	39.8	20 34 42.53
13	134	52	53	49.3	53	18.4	144.60	0.64	.0048134	39.3	20 30 46.61
14	135	53	51	39.0	51	7.9	144.55	0.75	.0049072	38.7	20 26 50.71
15	136	54	49	27.6	48	56.3	144.50	0.84	.0049994	38.0	20 22 54.80
16	137	55	47	15.0	46	43.6	144.45	0.92	.0050897	37.2	20 18 58.89
17	138	56	45	1.1	44	29.6	144.40	0.97	.0051779	36.4	20 15 2.98
18	139	57	42	46.0	42	14.3	144.35	0.98	.0052641	35.5	20 11 7.06
19	140	58	40	29.7	39	57.8	144.30	0.96	.0053482	34.6	20 7 11.15
20	141	59	38	12.2	37	40.1	144.24	0.92	.0054302	33.7	20 3 15.24
21	142	60	35	53.4	35	21.2	144.18	0.85	.0055100	32.8	19 59 19.33
22	143	61	33	33.2	33	0.9	144.12	0.77	.0055875	31.9	19 55 23.42
23	144	62	31	11.6	30	39.1	144.06	0.65	.0056629	31.0	19 51 27.50
24	145	63	28	48.6	28	15.9	144.00	0.53	.0057362	30.1	19 47 31.59
25	146	64	26	24.2	25	51.3	143.95	0.39	.0058076	29.3	19 43 31.68
26	147	65	23	58.3	23	25.3	143.89	0.26	.0058770	28.5	19 39 39.77
27	148	66	21	31.1	20	57.9	143.83	0.13	.0059445	27.8	19 35 43.86
28	149	67	19	2.6	18	29.2	143.78	+0.02	.0060102	27.1	19 31 47.94
29	150	68	16	32.7	15	59.1	143.73	—0.07	.0060742	26.4	19 27 52.03
30	151	69	14	1.5	13	27.7	143.68	0.14	.0061367	25.8	19 23 56.12
31	152	70	11	29.1	10	55.2	143.63	0.17	.0061978	25.2	19 20 0.21
32	153	71	8	55.5	8	21.4	143.58	—0.17	0.0062577	24.6	19 16 4.30

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.		
1	16 22.4	16 23.5	59 59.0	+0.45	60 3.1	+0.23	h. m. 8 56.2	m. 2.08	d. 10.3	
2	16 23.9	16 23.4	60 4.4	-0.01	60 2.8	-0.27	9 46.6	2.13	11.3	
3	16 22.2	16 20.0	59 58.0	0.53	59 50.1	0.79	10 38.7	2.22	12.3	
4	16 17.0	16 13.1	59 39.0	1.05	59 25.0	1.29	11 33.4	2.33	13.3	
5	16 8.6	16 3.4	59 8.2	1.50	58 49.2	1.67	12 30.5	2.42	14.3	
6	15 57.7	15 51.6	58 28.3	1.81	58 5.8	1.92	13 29.2	2.45	15.3	
7	15 45.2	15 38.7	57 42.4	1.98	57 18.5	2.00	14 27.6	2.40	16.3	
8	15 32.2	15 25.8	56 54.6	1.98	56 31.1	1.92	15 23.8	2.27	17.3	
9	15 19.7	15 13.9	56 8.6	1.82	55 47.5	1.70	16 16.4	2.11	18.3	
10	15 8.6	15 3.8	55 27.9	1.56	55 10.2	1.39	17 5.0	1.95	19.3	
11	14 59.5	14 55.9	54 54.6	1.20	54 41.4	1.00	17 50.0	1.81	20.3	
12	14 53.0	14 50.7	54 30.6	0.80	54 22.3	0.58	18 32.2	1.71	21.3	
13	14 49.2	14 48.4	54 16.6	-0.37	54 13.5	-0.15	19 12.5	1.66	22.3	
14	14 48.2	14 48.7	54 13.0	+0.06	54 14.9	+0.26	19 52.1	1.65	23.3	
15	14 49.9	14 51.7	54 19.2	0.45	54 25.8	0.64	20 32.1	1.69	24.3	
16	14 54.0	14 56.9	54 34.5	0.81	54 45.1	0.95	21 13.5	1.77	25.3	
17	15 0.3	15 4.0	54 57.3	1.08	55 11.0	1.20	21 57.6	1.90	26.3	
18	15 8.1	15 12.4	55 25.9	1.28	55 41.7	1.35	22 45.0	2.06	27.3	
19	15 16.9	15 21.4	55 58.2	1.40	56 15.1	1.42	23 36.5	2.23	28.3	
20	15 26.1	15 30.7	56 32.1	1.42	56 49.0	1.40	♂		29.3	
21	15 35.2	15 39.6	57 5.6	1.36	57 21.6	1.31	0 31.8	2.37	0.7	
22	15 43.7	15 47.7	57 36.9	1.24	57 51.4	1.17	1 29.7	2.44	1.7	
23	15 51.4	15 54.8	58 4.9	1.09	58 17.5	1.00	2 28.4	2.43	2.7	
24	15 57.9	16 0.7	58 28.9	0.91	58 39.3	0.82	3 26.0	2.35	3.7	
25	16 3.2	16 5.4	58 48.5	0.72	58 56.7	0.63	4 21.0	2.23	4.7	
26	16 7.4	16 9.0	59 3.7	0.54	59 9.7	0.45	5 13.2	2.12	5.7	
27	16 10.3	16 11.3	59 14.5	0.35	59 18.2	0.25	6 3.1	2.05	6.7	
28	16 11.9	16 12.2	59 20.5	+0.14	59 21.6	+0.08	6 51.8	2.02	7.7	
29	16 12.2	16 11.7	59 21.3	-0.09	59 19.5	-0.22	7 40.5	2.04	8.7	
30	16 10.7	16 9.3	59 16.1	0.35	59 11.0	0.50	8 30.4	2.12	9.7	
31	16 7.5	16 5.1	59 4.1	0.65	58 55.4	0.80	9 22.6	2.23	10.7	
32	16 2.2	15 58.9	58 44.8	-0.95	58 32.5	-1.10	10 17.5	2.34	11.7	



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 1.					THURSDAY 3.				
	h. m. s.	s.	N. O. I. "	"		h. m. s.	s.	S. O. I. "	"
0	11 16 49.73	2.1654	N. 0 52 42.2	16.338	0	13 2 34.82	2.3070	S. 11 52 5.2	14.378
1	11 18 59.66	2.1658	0 36 21.6	16.347	1	13 4 50.95	2.3706	12 6 55.5	14.503
2	11 21 9.62	2.1663	0 20 0.6	16.354	2	13 7 7.99	2.3743	12 21 41.5	14.726
3	11 23 19.62	2.1669	N. 0 3 39.2	16.359	3	13 9 23.85	2.3779	12 36 23.0	14.822
4	11 25 29.65	2.1676	S. 0 12 42.5	16.363	4	13 11 40.64	2.3817	12 50 59.8	14.875
5	11 27 39.73	2.1683	0 29 4.4	16.366	5	13 13 57.66	2.3855	13 5 32.0	14.896
6	11 29 49.85	2.1691	0 45 26.4	16.368	6	13 16 14.90	2.3893	13 19 59.3	14.915
7	11 32 0.02	2.1700	1 1 48.3	16.365	7	13 18 32.37	2.3931	13 34 21.7	14.932
8	11 34 10.25	2.1710	1 18 10.3	16.363	8	13 20 50.07	2.3969	13 48 39.1	14.947
9	11 36 20.54	2.1720	1 34 31.9	16.359	9	13 23 8.00	2.3996	14 2 51.4	14.961
10	11 38 30.89	2.1731	1 50 53.3	16.348	10	13 25 26.17	2.3947	14 16 58.4	14.973
11	11 40 41.31	2.1743	2 7 14.3	16.346	11	13 27 44.58	2.3987	14 31 0.3	14.984
12	11 42 51.80	2.1756	2 23 34.8	16.337	12	13 30 3.22	2.3927	14 44 56.5	14.992
13	11 45 2.37	2.1769	2 39 54.7	16.326	13	13 32 29.10	2.3967	14 58 47.3	14.999
14	11 47 13.03	2.1783	2 56 13.9	16.313	14	13 34 41.93	2.3996	15 12 32.4	14.994
15	11 49 23.77	2.1798	3 12 32.3	16.299	15	13 37 0.60	2.3949	15 26 11.8	14.988
16	11 51 34.61	2.1814	3 28 40.8	16.283	16	13 39 20.92	2.3991	15 39 45.4	14.970
17	11 53 45.54	2.1830	3 45 6.3	16.266	17	13 41 40.08	2.3931	15 53 13.0	14.940
18	11 55 56.58	2.1847	4 1 21.7	16.247	18	13 44 0.19	2.3972	16 6 34.6	14.909
19	11 58 7.72	2.1865	4 17 35.9	16.226	19	13 46 20.55	2.3913	16 19 50.1	14.867
20	12 0 18.96	2.1884	4 33 48.8	16.203	20	13 48 41.15	2.3844	16 32 59.4	14.813
21	12 2 30.33	2.1903	4 50 0.3	16.179	21	13 51 2.00	2.3765	16 46 2.4	14.748
22	12 4 41.80	2.1923	5 6 10.3	16.153	22	13 53 23.09	2.3686	16 58 58.9	14.673
23	12 6 53.40	2.1944	S. 5 22 18.7	16.126	23	13 55 44.44	2.3597	S. 17 11 48.9	14.579
WEDNESDAY 2.					FRIDAY 4.				
	h. m. s.	s.	N. O. I. "	"		h. m. s.	s.	S. O. I. "	"
0	12 9 5.13	2.1965	S. 5 38 25.4	16.096	0	13 58 6.03	2.3509	S. 17 24 32.4	14.486
1	12 11 16.99	2.1986	5 54 30.3	16.065	1	14 0 27.87	2.3461	17 37 9.3	14.444
2	12 13 28.99	2.2011	6 10 33.2	16.032	2	14 2 49.96	2.3702	17 49 39.1	14.443
3	12 15 41.12	2.2044	6 26 34.2	16.006	3	14 5 12.30	2.3743	18 2 2.1	14.396
4	12 17 53.40	2.2089	6 42 33.0	15.982	4	14 7 34.89	2.3785	18 14 18.2	14.356
5	12 20 5.83	2.2094	6 58 29.6	15.954	5	14 9 57.72	2.3826	18 26 27.1	14.309
6	12 22 18.41	2.2109	7 14 23.9	15.924	6	14 12 20.80	2.3867	18 38 28.9	14.266
7	12 24 31.14	2.2135	7 30 15.8	15.893	7	14 14 44.13	2.3908	18 50 23.4	14.247
8	12 26 44.03	2.2162	7 46 5.1	15.860	8	14 17 7.70	2.3949	19 2 10.6	14.214
9	12 28 57.08	2.2189	8 1 51.8	15.796	9	14 19 31.51	2.3990	19 13 50.4	14.180
10	12 31 10.30	2.2217	8 17 35.8	15.709	10	14 21 55.57	2.4030	19 25 23.6	14.144
11	12 33 23.69	2.2246	8 33 16.9	15.661	11	14 24 19.87	2.4070	19 36 47.2	14.146
12	12 35 37.25	2.2275	8 48 55.1	15.611	12	14 26 44.41	2.4110	19 48 4.1	14.117
13	12 37 50.99	2.2305	9 4 30.2	15.560	13	14 29 9.19	2.4149	19 59 13.2	14.087
14	12 40 4.91	2.2336	9 20 2.2	15.505	14	14 31 34.20	2.4188	20 10 14.5	14.055
15	12 42 19.02	2.2367	9 35 30.9	15.450	15	14 33 59.44	2.4227	20 21 7.9	14.022
16	12 44 33.31	2.2399	9 50 56.2	15.393	16	14 36 24.92	2.4265	20 31 53.2	14.087
17	12 46 47.60	2.2431	10 6 18.1	15.335	17	14 38 50.63	2.4303	20 42 30.4	14.042
18	12 49 2.48	2.2464	10 21 36.4	15.274	18	14 41 16.56	2.4341	20 52 59.4	14.015
19	12 51 17.36	2.2497	10 36 51.0	15.212	19	14 43 42.71	2.4378	21 3 20.2	14.077
20	12 53 32.44	2.2530	10 52 1.8	15.148	20	14 46 9.09	2.4415	21 13 32.6	14.038
21	12 55 47.72	2.2564	11 7 8.7	15.082	21	14 48 35.69	2.4451	21 23 36.6	14.097
22	12 58 3.21	2.2599	11 22 11.7	15.015	22	14 51 2.50	2.4487	21 33 32.2	14.055
23	13 0 18.91	2.2634	11 37 10.6	14.946	23	14 53 29.53	2.4523	21 43 19.2	14.013
24	13 2 34.82	2.2670	S. 11 52 5.2	14.875	24	14 55 56.76	2.4556	S. 21 52 57.6	14.067



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 5.					MONDAY 7.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	14 55 56.76	2.4866	S. 21 52 57.6	9.867	0	16 56 6.68	2.5092	S. 26 29 50.1	1.791
1	14 58 24.19	2.4869	22 2 27.9	9.821	1	16 58 37.18	2.5074	26 31 32.6	1.824
2	15 0 51.83	2.4882	22 11 48.1	9.775	2	17 1 7.57	2.5056	26 33 5.0	1.857
3	15 3 19.66	2.4855	22 21 0.9	9.727	3	17 3 37.84	2.5036	26 34 27.4	1.891
4	15 5 47.69	2.4897	22 30 3.3	9.678	4	17 6 7.99	2.5014	26 35 39.9	1.925
5	15 8 15.91	2.4716	22 38 57.4	9.627	5	17 8 38.01	2.4991	26 36 42.5	0.960
6	15 10 44.31	2.4748	22 47 42.5	9.576	6	17 11 7.88	2.4967	26 37 35.1	0.795
7	15 13 12.89	2.4777	22 56 18.5	9.524	7	17 13 37.60	2.4941	26 38 17.8	0.630
8	15 15 41.64	2.4806	23 4 45.4	9.471	8	17 16 7.17	2.4914	26 38 50.7	0.466
9	15 18 10.56	2.4834	23 13 3.1	9.417	9	17 18 36.58	2.4887	26 39 13.7	0.302
10	15 20 39.65	2.4861	23 21 11.5	9.363	10	17 21 5.81	2.4866	26 39 27.0	0.138
11	15 23 8.90	2.4897	23 29 10.6	7.967	11	17 23 34.86	2.4897	26 39 30.5	0.023
12	15 25 38.30	2.4912	23 37 0.3	7.780	12	17 26 3.73	2.4796	26 39 24.3	0.186
13	15 28 7.85	2.4897	23 44 40.6	7.593	13	17 28 32.40	2.4768	26 39 8.4	0.346
14	15 30 37.55	2.4861	23 52 11.4	7.436	14	17 31 0.88	2.4739	26 38 42.8	0.506
15	15 33 7.39	2.4864	23 59 32.7	7.276	15	17 33 29.16	2.4696	26 38 7.6	0.666
16	15 35 37.36	2.5006	24 6 44.4	7.116	16	17 35 57.92	2.4660	26 37 22.9	0.825
17	15 38 7.46	2.5057	24 13 46.5	6.955	17	17 38 25.06	2.4622	26 36 28.6	0.983
18	15 40 37.68	2.5046	24 20 39.0	6.794	18	17 40 52.68	2.4584	26 35 24.9	1.141
19	15 43 8.91	2.5084	24 27 91.8	6.632	19	17 43 20.07	2.4545	26 34 11.7	1.298
20	15 45 38.45	2.5061	24 33 54.9	6.469	20	17 45 47.92	2.4504	26 32 49.9	1.454
21	15 48 8.99	2.5096	24 40 18.2	6.306	21	17 48 14.12	2.4468	26 31 17.3	1.610
22	15 50 39.63	2.5112	24 46 31.6	6.143	22	17 50 40.78	2.4431	26 29 36.0	1.764
23	15 53 10.35	2.5126	S. 24 52 35.2	5.978	23	17 53 7.18	2.4378	S. 26 27 45.5	1.918
SUNDAY 6.					TUESDAY 8.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	15 55 41.16	2.5141	S. 24 58 29.0	5.812	0	17 55 33.32	2.4384	S. 26 25 45.9	2.070
1	15 58 12.05	2.5163	25 4 12.9	5.648	1	17 57 59.19	2.4360	26 23 37.1	2.222
2	16 0 43.00	2.5163	25 9 46.8	5.483	2	18 0 24.79	2.4343	26 21 19.2	2.373
3	16 3 14.01	2.5178	25 15 10.8	5.317	3	18 2 50.11	2.4196	26 18 52.3	2.523
4	16 5 45.08	2.5162	25 20 24.8	5.150	4	18 5 15.14	2.4148	26 16 16.5	2.672
5	16 8 16.20	2.5190	25 25 28.8	4.983	5	18 7 39.88	2.4099	26 13 31.7	2.820
6	16 10 47.36	2.5196	25 30 22.8	4.816	6	18 10 4.33	2.4049	26 10 38.1	2.967
7	16 13 18.55	2.5201	25 35 6.7	4.648	7	18 12 28.48	2.3999	26 7 35.7	3.112
8	16 15 49.77	2.5205	25 39 40.6	4.481	8	18 14 52.32	2.3948	26 4 24.6	3.256
9	16 18 21.01	2.5207	25 44 4.4	4.313	9	18 17 15.85	2.3897	26 1 4.8	3.402
10	16 20 52.26	2.5208	25 48 18.1	4.145	10	18 19 39.08	2.3844	25 57 36.3	3.545
11	16 23 23.51	2.5208	25 52 21.7	3.977	11	18 22 1.99	2.3791	25 53 59.3	3.687
12	16 25 54.76	2.5207	25 56 15.3	3.809	12	18 24 24.57	2.3737	25 50 13.8	3.828
13	16 28 26.00	2.5205	25 59 58.8	3.640	13	18 26 46.83	2.3682	25 46 19.9	3.967
14	16 30 57.22	2.5201	26 3 32.1	3.472	14	18 29 8.76	2.3627	25 42 17.7	4.105
15	16 33 28.41	2.5196	26 6 55.4	3.308	15	18 31 30.35	2.3571	25 38 7.2	4.243
16	16 35 59.57	2.5190	26 10 8.5	3.134	16	18 33 51.61	2.3514	25 33 48.5	4.380
17	16 38 30.68	2.5182	26 13 11.5	2.966	17	18 36 12.52	2.3457	25 29 21.6	4.516
18	16 41 1.75	2.5173	26 16 4.4	2.797	18	18 38 33.09	2.3399	25 24 46.6	4.650
19	16 43 32.76	2.5163	26 18 47.2	2.629	19	18 40 53.31	2.3341	25 20 3.6	4.788
20	16 46 3.71	2.5161	26 21 19.9	2.461	20	18 43 13.18	2.3282	25 15 12.6	4.915
21	16 48 34.58	2.5158	26 23 42.5	2.293	21	18 45 32.70	2.3223	25 10 13.8	5.046
22	16 51 5.37	2.5154	26 25 55.1	2.125	22	18 47 51.86	2.3163	25 5 7.1	5.176
23	16 53 36.07	2.5160	26 27 57.6	1.956	23	18 50 10.66	2.3103	24 59 52.7	5.304
24	16 56 6.68	2.5092	S. 26 29 50.1	1.791	24	18 52 29.10	2.3043	S. 24 54 30.6	5.431



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 9.					FRIDAY 11.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	18 52 29.10	2.3043	S. 24 54 30.6	5.481	0	20 35 54.65	2.0006	S. 18 29 39.0	10.161
1	18 54 47.18	2.3082	24 49 0.9	5.568	1	20 37 55.07	2.0043	18 19 27.2	10.282
2	18 57 4.89	2.3021	24 43 23.7	5.683	2	20 39 55.17	1.9989	18 9 11.1	10.393
3	18 59 32.23	2.3060	24 37 39.0	5.807	3	20 41 54.94	1.9935	17 58 50.9	10.573
4	19 1 39.21	2.3098	24 31 46.9	5.929	4	20 43 54.39	1.9881	17 48 26.5	10.660
5	19 3 55.81	2.3136	24 25 47.5	6.080	5	20 45 53.52	1.9826	17 37 58.1	10.807
6	19 6 12.04	2.3074	24 19 40.9	6.170	6	20 47 52.33	1.9772	17 27 25.6	10.974
7	19 8 27.90	2.3012	24 13 27.1	6.289	7	20 49 50.83	1.9718	17 16 49.2	10.989
8	19 10 43.38	2.3050	24 7 6.2	6.407	8	20 51 49.02	1.9678	17 6 8.9	10.704
9	19 12 58.48	2.3088	24 0 38.2	6.594	9	20 53 46.90	1.9632	16 55 24.7	10.787
10	19 15 13.21	2.3126	23 54 3.3	6.689	10	20 55 44.48	1.9573	16 44 36.8	10.890
11	19 17 27.68	2.3164	23 47 21.5	6.763	11	20 57 41.76	1.9522	16 33 45.1	10.982
12	19 19 41.52	2.3202	23 40 32.9	6.866	12	20 59 38.74	1.9473	16 22 49.7	10.983
13	19 21 55.11	2.3239	23 33 37.5	6.978	13	21 1 35.43	1.9424	16 11 50.7	11.012
14	19 24 8.31	2.3166	23 26 35.5	7.089	14	21 3 31.83	1.9376	16 0 48.2	11.071
15	19 26 21.13	2.3106	23 19 26.9	7.188	15	21 5 27.94	1.9326	15 49 42.2	11.128
16	19 28 33.57	2.3041	23 12 11.7	7.306	16	21 7 23.77	1.9281	15 38 32.8	11.166
17	19 30 45.63	2.1978	23 4 50.1	7.413	17	21 9 19.32	1.9233	15 27 20.0	11.242
18	19 32 57.31	2.1916	22 57 22.1	7.519	18	21 11 14.59	1.9190	15 16 3.8	11.297
19	19 35 8.61	2.1852	22 49 47.8	7.623	19	21 13 9.59	1.9148	15 4 44.4	11.361
20	19 37 19.53	2.1788	22 42 7.3	7.728	20	21 15 4.33	1.9101	14 53 21.7	11.404
21	19 39 30.07	2.1724	22 34 20.6	7.829	21	21 16 58.80	1.9057	14 41 55.8	11.457
22	19 41 40.22	2.1660	22 26 27.8	7.981	22	21 18 53.01	1.9014	14 30 26.8	11.510
23	19 43 49.99	2.1597	S. 22 18 28.9	8.081	23	21 20 46.96	1.8971	S. 14 18 54.7	11.561
THURSDAY 10.					SATURDAY 12.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	19 45 59.39	2.1534	S. 22 10 24.1	8.180	0	21 22 40.66	1.8922	S. 14 7 19.5	11.611
1	19 48 8.40	2.1471	22 2 13.4	8.227	1	21 24 34.11	1.8867	13 55 41.4	11.660
2	19 50 17.04	2.1408	21 53 56.9	8.328	2	21 26 27.31	1.8817	13 44 0.3	11.700
3	19 52 25.30	2.1346	21 45 34.6	8.418	3	21 28 20.27	1.8807	13 32 16.3	11.737
4	19 54 33.19	2.1283	21 37 6.7	8.513	4	21 30 12.99	1.8768	13 20 29.5	11.808
5	19 56 40.70	2.1221	21 28 33.1	8.606	5	21 32 5.48	1.8729	13 8 39.9	11.846
6	19 58 47.84	2.1159	21 19 54.0	8.697	6	21 33 57.74	1.8681	12 56 47.6	11.894
7	20 0 54.61	2.1097	21 11 9.5	8.788	7	21 35 49.77	1.8638	12 44 52.6	11.960
8	20 3 1.01	2.1036	21 2 19.5	8.877	8	21 37 41.58	1.8617	12 32 54.9	11.968
9	20 5 7.04	2.0974	20 53 24.2	8.966	9	21 39 33.17	1.8581	12 20 54.6	12.026
10	20 7 12.70	2.0912	20 44 23.6	9.058	10	21 41 24.55	1.8546	12 8 51.8	12.066
11	20 9 18.00	2.0853	20 35 17.8	9.139	11	21 43 15.72	1.8513	11 56 46.4	12.110
12	20 11 22.94	2.0792	20 26 6.9	9.294	12	21 45 6.69	1.8478	11 44 38.6	12.150
13	20 13 27.51	2.0732	20 16 50.9	9.306	13	21 46 57.45	1.8444	11 32 28.4	12.190
14	20 15 31.73	2.0672	20 7 29.9	9.361	14	21 48 48.02	1.8411	11 20 15.8	12.229
15	20 17 35.59	2.0613	19 58 4.0	9.472	15	21 50 38.39	1.8379	11 8 0.9	12.267
16	20 19 39.09	2.0554	19 48 33.2	9.558	16	21 52 28.57	1.8348	10 55 43.7	12.305
17	20 21 42.24	2.0496	19 38 57.6	9.638	17	21 54 18.57	1.8317	10 43 24.3	12.342
18	20 23 45.04	2.0438	19 29 17.2	9.719	18	21 56 8.38	1.8286	10 31 2.7	12.378
19	20 25 47.60	2.0381	19 19 32.2	9.780	19	21 57 58.02	1.8259	10 18 38.9	12.413
20	20 27 49.61	2.0322	19 9 42.5	9.866	20	21 59 47.49	1.8230	10 6 13.1	12.446
21	20 29 51.37	2.0266	18 59 48.3	9.941	21	22 1 36.79	1.8202	9 53 45.2	12.482
22	20 31 52.80	2.0210	18 49 49.6	10.016	22	22 3 25.92	1.8178	9 41 15.3	12.516
23	20 33 53.89	2.0154	18 39 46.5	10.086	23	22 5 14.89	1.8149	9 28 43.4	12.548
24	20 35 54.65	2.0098	S. 18 29 39.0	10.161	24	22 7 3.71	1.8124	S. 9 16 9.6	12.580



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 13.					TUESDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	22 7 3.71	1.8194	S. 9 16 9.6	12.880	1	23 32 27.41	1.7734	N. 1 11 50.5	13.338
2	22 8 52.38	1.8099	9 3 33.9	12.871	2	23 34 13.84	1.7743	1 25 10.8	13.338
3	22 10 40.90	1.8075	8 50 56.3	12.842	3	23 36 0.33	1.7754	1 38 31.0	13.337
4	22 12 29.27	1.8081	8 38 16.9	12.873	4	23 37 46.89	1.7765	1 51 51.2	13.336
5	22 14 17.51	1.8098	8 25 35.7	12.701	5	23 39 33.51	1.7777	2 5 11.3	13.333
6	22 16 5.61	1.8005	8 12 52.8	12.739	6	23 41 20.21	1.7789	2 18 31.2	13.330
7	22 17 53.58	1.7984	8 0 8.2	12.767	7	23 43 6.98	1.7803	2 31 50.9	13.326
8	22 19 41.42	1.7988	7 47 21.9	12.785	8	23 44 53.84	1.7817	2 45 10.4	13.322
9	22 21 29.14	1.7943	7 34 34.0	12.811	9	23 46 40.78	1.7831	2 58 29.6	13.317
10	22 23 16.74	1.7924	7 21 44.6	12.887	10	23 48 27.81	1.7846	3 11 48.5	13.312
11	22 25 4.23	1.7905	7 8 53.6	12.893	11	23 50 14.93	1.7862	3 25 7.0	13.306
12	22 26 51.61	1.7886	6 56 1.2	12.896	12	23 52 2.15	1.7879	3 38 25.2	13.299
13	22 28 38.89	1.7871	6 43 7.3	12.910	13	23 53 49.48	1.7896	3 51 42.9	13.291
14	22 30 26.06	1.7864	6 30 12.0	12.963	14	23 55 36.91	1.7914	4 5 0.1	13.283
15	22 32 13.14	1.7889	6 17 15.3	12.966	15	23 57 24.45	1.7933	4 18 16.8	13.274
16	22 34 0.13	1.7894	6 4 17.3	12.978	16	23 59 12.11	1.7953	4 31 33.0	13.264
17	22 35 47.03	1.7810	5 51 18.0	12.999	17	0 0 59.89	1.7973	4 44 48.5	13.253
18	22 37 33.84	1.7796	5 38 17.4	12.020	18	0 2 47.79	1.7994	4 58 3.4	13.242
19	22 39 20.58	1.7784	5 25 15.6	12.089	19	0 4 35.82	1.8016	5 11 17.5	13.230
20	22 41 7.25	1.7772	5 12 12.7	12.068	20	0 6 23.99	1.8039	5 24 30.9	13.217
21	22 42 53.84	1.7760	4 59 8.6	12.077	21	0 8 12.29	1.8062	5 37 43.5	13.203
22	22 44 40.37	1.7749	4 46 3.4	12.085	22	0 10 0.73	1.8086	5 50 55.3	13.189
23	22 46 26.83	1.7739	4 32 57.2	12.112	23	0 11 49.32	1.8111	6 4 6.2	13.173
24	22 48 13.24	1.7730	S. 4 19 50.0	12.139	24	0 13 38.06	1.8136	N. 6 17 16.1	13.167
MONDAY 14.					WEDNESDAY 16.				
0	22 49 59.59	1.7722	S. 4 6 41.8	12.144	0	0 15 26.95	1.8162	N. 6 30 25.1	13.140
1	22 51 45.90	1.7714	3 53 32.7	12.160	1	0 17 16.00	1.8196	6 43 33.0	13.123
2	22 53 32.16	1.7707	3 40 22.6	12.176	2	0 19 5.21	1.8216	6 56 39.9	13.106
3	22 55 18.38	1.7700	3 27 11.7	12.189	3	0 20 54.59	1.8244	7 9 45.7	13.087
4	22 57 4.56	1.7695	3 13 59.9	12.208	4	0 22 44.14	1.8273	7 22 50.3	13.067
5	22 58 50.71	1.7690	3 0 47.3	12.216	5	0 24 33.86	1.8302	7 35 53.7	13.047
6	23 0 36.84	1.7685	2 47 34.0	12.225	6	0 26 23.76	1.8332	7 48 55.9	13.025
7	23 2 22.94	1.7682	2 34 19.9	12.240	7	0 28 13.85	1.8363	8 1 56.7	13.003
8	23 4 9.03	1.7679	2 21 5.2	12.251	8	0 30 4.12	1.8395	8 14 56.2	12.980
9	23 5 55.10	1.7677	2 7 49.8	12.261	9	0 31 54.59	1.8427	8 27 54.3	12.956
10	23 7 41.16	1.7676	1 54 33.9	12.270	10	0 33 45.25	1.8460	8 40 50.9	12.931
11	23 9 27.22	1.7676	1 41 17.4	12.279	11	0 35 36.11	1.8493	8 53 46.0	12.906
12	23 11 13.27	1.7676	1 28 0.4	12.288	12	0 37 27.17	1.8528	9 6 39.6	12.879
13	23 12 59.33	1.7677	1 14 42.9	12.298	13	0 39 18.44	1.8563	9 19 31.5	12.852
14	23 14 45.39	1.7679	1 1 24.9	12.308	14	0 41 9.92	1.8599	9 32 21.8	12.824
15	23 16 31.47	1.7681	0 48 6.5	12.309	15	0 43 1.62	1.8635	9 45 10.4	12.795
16	23 18 17.56	1.7684	0 34 47.8	12.318	16	0 44 53.54	1.8672	9 57 57.2	12.764
17	23 20 3.08	1.7686	0 21 28.7	12.320	17	0 46 45.08	1.8709	10 10 42.1	12.733
18	23 21 49.82	1.7688	S. 0 8 9.4	12.324	18	0 48 38.05	1.8747	10 23 25.2	12.701
19	23 23 35.99	1.7689	N. 0 5 10.2	12.328	19	0 50 30.65	1.8786	10 36 6.3	12.669
20	23 25 22.19	1.7704	0 18 30.0	12.331	20	0 52 23.48	1.8826	10 48 45.5	12.636
21	23 27 8.43	1.7710	0 31 50.0	12.334	21	0 54 16.56	1.8867	11 1 22.6	12.602
22	23 28 54.71	1.7717	0 45 10.1	12.336	22	0 56 9.88	1.8908	11 13 57.7	12.566
23	23 30 41.03	1.7735	0 58 30.3	12.337	23	0 58 3.45	1.8949	11 26 30.6	12.529
24	23 32 27.41	1.7734	N. 1 11 50.5	12.338	24	0 59 57.27	1.8991	N. 11 39 1.2	12.492



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 17.					SATURDAY 19.				
0	0 59 57.27	1.8991	N.11 39 1.2	12.492	0	2 37 2.86	2.1636	N.20 35 39.1	6.423
1	1 1 51.35	1.9084	11 51 29.6	12.454	1	2 30 12.87	2.1700	20 45 1.7	6.329
2	1 3 45.68	1.9078	12 3 55.7	12.416	2	2 41 23.26	2.1764	20 54 18.6	6.234
3	1 5 40.38	1.9122	12 16 19.4	12.375	3	2 43 34.03	2.1837	21 3 29.8	6.138
4	1 7 35.15	1.9167	12 28 40.7	12.334	4	2 45 45.19	2.1891	21 12 35.2	6.041
5	1 9 30.28	1.9212	12 40 59.5	12.292	5	2 47 56.73	2.1965	21 21 34.7	5.942
6	1 11 25.69	1.9258	12 53 15.7	12.249	6	2 50 8.65	2.2019	21 30 28.2	5.841
7	1 13 21.38	1.9305	13 5 29.3	12.205	7	2 52 20.95	2.2082	21 39 15.6	5.739
8	1 15 17.35	1.9352	13 17 40.3	12.160	8	2 54 33.64	2.2146	21 47 56.9	5.636
9	1 17 13.61	1.9400	13 29 48.5	12.113	9	2 56 46.71	2.2210	21 56 32.0	5.532
10	1 19 10.15	1.9448	13 41 53.8	12.065	10	2 59 0.16	2.2274	22 5 0.8	5.427
11	1 21 6.99	1.9497	13 53 56.3	12.017	11	3 1 13.99	2.2338	22 13 23.3	5.321
12	1 23 4.12	1.9547	14 5 55.9	11.968	12	3 3 28.21	2.2402	22 21 39.3	5.212
13	1 25 1.55	1.9597	14 17 52.5	11.917	13	3 5 42.81	2.2466	22 29 48.8	5.102
14	1 26 59.28	1.9648	14 29 46.0	11.865	14	3 7 57.79	2.2530	22 37 51.6	4.991
15	1 28 57.32	1.9699	14 41 36.4	11.813	15	3 10 13.15	2.2591	22 45 47.7	4.879
16	1 30 55.67	1.9751	14 53 23.6	11.760	16	3 12 28.68	2.2654	22 53 37.1	4.766
17	1 32 54.33	1.9803	15 5 7.6	11.706	17	3 14 45.00	2.2717	23 1 19.7	4.652
18	1 34 53.31	1.9856	15 16 48.3	11.650	18	3 17 1.49	2.2780	23 8 55.3	4.536
19	1 36 52.60	1.9909	15 28 25.6	11.593	19	3 19 18.35	2.2842	23 16 23.9	4.418
20	1 38 52.23	1.9963	15 39 59.4	11.534	20	3 21 35.59	2.2904	23 23 45.5	4.300
21	1 40 52.16	2.0017	15 51 29.7	11.475	21	3 23 53.20	2.2966	23 30 59.9	4.180
22	1 42 52.43	2.0072	16 2 56.4	11.415	22	3 26 11.17	2.3026	23 38 7.1	4.059
23	1 44 53.03	2.0128	N.16 14 19.5	11.353	23	3 28 29.51	2.3087	N.23 45 6.9	3.936
FRIDAY 18.					SUNDAY 20.				
0	1 46 53.97	2.0184	N.16 25 38.8	11.291	0	3 30 48.92	2.3147	N.23 51 59.4	3.812
1	1 48 55.24	2.0240	16 36 54.4	11.227	1	3 33 7.29	2.3207	23 58 44.4	3.687
2	1 50 56.85	2.0297	16 48 6.1	11.162	2	3 35 26.71	2.3267	24 5 21.9	3.561
3	1 52 58.80	2.0354	16 59 13.9	11.096	3	3 37 46.49	2.3326	24 11 51.7	3.433
4	1 55 1.10	2.0412	17 10 17.6	11.029	4	3 40 6.62	2.3385	24 18 13.9	3.304
5	1 57 3.75	2.0470	17 21 17.3	10.960	5	3 42 27.11	2.3443	24 24 28.3	3.175
6	1 59 6.74	2.0529	17 32 12.8	10.890	6	3 44 47.94	2.3500	24 30 34.9	3.044
7	2 1 10.09	2.0588	17 43 4.1	10.819	7	3 47 9.12	2.3557	24 36 33.6	2.912
8	2 3 13.79	2.0647	17 53 51.1	10.747	8	3 49 30.63	2.3613	24 42 24.3	2.778
9	2 5 17.85	2.0707	18 4 33.7	10.673	9	3 51 52.48	2.3669	24 48 7.0	2.643
10	2 7 22.27	2.0767	18 15 11.9	10.598	10	3 54 14.66	2.3724	24 53 41.5	2.507
11	2 9 27.05	2.0827	18 25 45.6	10.523	11	3 56 37.17	2.3779	24 59 7.8	2.370
12	2 11 32.19	2.0888	18 36 14.7	10.446	12	3 59 0.01	2.3833	25 4 25.9	2.232
13	2 13 37.70	2.0949	18 46 39.2	10.368	13	4 1 23.17	2.3888	25 9 35.6	2.093
14	2 15 43.58	2.1010	18 56 58.9	10.288	14	4 3 46.64	2.3938	25 14 36.9	1.951
15	2 17 49.83	2.1072	19 7 13.8	10.207	15	4 6 10.42	2.3989	25 19 29.8	1.810
16	2 19 56.44	2.1134	19 17 23.8	10.125	16	4 8 34.51	2.4040	25 24 14.1	1.667
17	2 22 3.43	2.1196	19 27 28.9	10.043	17	4 10 58.90	2.4090	25 28 49.8	1.523
18	2 24 10.79	2.1258	19 37 28.9	9.960	18	4 13 23.59	2.4139	25 33 16.9	1.378
19	2 26 18.52	2.1320	19 47 23.8	9.873	19	4 15 48.57	2.4188	25 37 35.3	1.233
20	2 28 26.63	2.1383	19 57 13.6	9.786	20	4 18 13.84	2.4236	25 41 44.9	1.086
21	2 30 35.12	2.1447	20 6 58.1	9.697	21	4 20 39.39	2.4281	25 45 45.7	0.938
22	2 32 43.99	2.1510	20 16 37.2	9.607	22	4 23 5.21	2.4326	25 49 37.5	0.789
23	2 34 53.23	2.1573	20 26 10.9	9.516	23	4 25 31.30	2.4371	25 53 20.4	0.639
24	2 37 2.86	2.1636	N.20 35 39.1	9.423	24	4 27 57.66	2.4415	N.25 56 54.2	0.489



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 21.					WEDNESDAY 23.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	4 27 57.66	2.4416	N.25 56 54.2	3.469	0	6 27 55.33	2.4681	N.25 39 2.8	4.323
1	4 30 24.27	2.4457	26 0 19.0	3.337	1	6 30 25.76	2.5003	25 34 37.9	4.496
2	4 32 51.14	2.4498	26 3 34.7	3.185	2	6 32 56.09	2.5046	25 30 3.3	4.669
3	4 35 18.25	2.4538	26 6 41.2	3.081	3	6 35 26.30	2.5088	25 25 18.9	4.821
4	4 37 45.60	2.4578	26 9 38.4	2.977	4	6 37 56.40	2.5006	25 20 24.8	4.983
5	4 40 13.19	2.4617	26 12 26.4	2.722	5	6 40 26.37	2.4984	25 15 21.0	5.144
6	4 42 41.00	2.4654	26 15 5.0	2.686	6	6 42 56.21	2.4961	25 10 7.5	5.304
7	4 45 9.03	2.4689	26 17 34.3	2.410	7	6 45 25.91	2.4937	25 4 44.5	5.463
8	4 47 37.27	2.4724	26 19 54.2	2.262	8	6 47 55.46	2.4913	24 59 11.9	5.622
9	4 50 5.72	2.4758	26 22 4.6	2.094	9	6 50 24.86	2.4887	24 53 29.8	5.781
10	4 52 34.36	2.4790	26 24 5.5	1.925	10	6 52 54.11	2.4861	24 47 38.2	5.939
11	4 55 3.20	2.4822	26 25 56.8	1.776	11	6 55 23.19	2.4833	24 41 37.1	6.096
12	4 57 32.22	2.4853	26 27 38.6	1.615	12	6 57 52.11	2.4804	24 35 26.7	6.252
13	5 0 1.42	2.4881	26 29 10.7	1.454	13	7 0 20.85	2.4775	24 29 6.9	6.407
14	5 2 30.79	2.4908	26 30 33.1	1.288	14	7 2 49.41	2.4746	24 22 37.8	6.561
15	5 5 0.32	2.4935	26 31 45.9	1.122	15	7 5 17.79	2.4714	24 15 59.5	6.716
16	5 7 30.01	2.4960	26 32 48.9	0.960	16	7 7 45.98	2.4682	24 9 12.0	6.868
17	5 9 59.84	2.4984	26 33 42.1	0.806	17	7 10 13.97	2.4649	24 2 15.3	7.021
18	5 12 29.82	2.5007	26 34 25.6	0.653	18	7 12 41.77	2.4615	23 55 9.5	7.172
19	5 14 59.93	2.5029	26 35 59.3	0.479	19	7 15 9.36	2.4581	23 47 54.6	7.323
20	5 17 30.17	2.5049	26 35 23.1	0.314	20	7 17 36.74	2.4546	23 40 30.8	7.472
21	5 20 0.53	2.5068	26 35 37.0	0.149	21	7 20 3.91	2.4510	23 32 58.0	7.620
22	5 22 30.99	2.5085	26 35 41.0	0.016	22	7 22 30.86	2.4473	23 25 16.4	7.767
23	5 25 1.55	2.5102	N.26 35 35.1	0.191	23	7 24 57.69	2.4435	N.23 17 26.0	7.913
TUESDAY 22.					THURSDAY 24.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	5 27 32.91	2.5117	N.26 35 19.3	0.346	0	7 27 24.09	2.4398	N.23 9 26.9	8.068
1	5 30 2.95	2.5130	26 34 53.5	0.512	1	7 29 50.36	2.4369	23 1 19.1	8.202
2	5 32 33.77	2.5142	26 34 17.8	0.678	2	7 32 16.40	2.4321	22 53 2.6	8.346
3	5 35 4.65	2.5153	26 33 32.1	0.845	3	7 34 42.21	2.4282	22 44 37.6	8.487
4	5 37 35.60	2.5162	26 32 36.4	1.011	4	7 37 7.78	2.4242	22 36 4.1	8.628
5	5 40 6.60	2.5171	26 31 30.7	1.178	5	7 39 33.11	2.4201	22 27 22.2	8.768
6	5 42 37.65	2.5178	26 30 15.0	1.345	6	7 41 58.19	2.4160	22 18 31.9	8.906
7	5 45 8.74	2.5185	26 28 49.3	1.512	7	7 44 23.03	2.4118	22 9 33.4	9.044
8	5 47 39.85	2.5188	26 27 13.6	1.679	8	7 46 47.61	2.4076	22 0 26.6	9.181
9	5 50 10.99	2.5191	26 25 27.8	1.847	9	7 49 11.94	2.4033	21 51 11.6	9.317
10	5 52 42.14	2.5198	26 23 32.0	2.014	10	7 51 36.01	2.3991	21 41 48.6	9.451
11	5 55 13.30	2.5198	26 21 26.2	2.181	11	7 53 59.83	2.3948	21 32 17.6	9.583
12	5 57 44.45	2.5193	26 19 10.3	2.348	12	7 56 23.39	2.3905	21 22 38.6	9.715
13	6 0 15.59	2.5189	26 16 44.4	2.514	13	7 58 46.69	2.3861	21 12 51.8	9.845
14	6 2 46.72	2.5186	26 14 8.6	2.681	14	8 1 9.72	2.3817	21 2 57.2	9.974
15	6 5 17.82	2.5180	26 11 22.7	2.847	15	8 3 32.49	2.3773	20 52 54.9	10.102
16	6 7 48.88	2.5174	26 8 26.9	3.013	16	8 5 54.99	2.3729	20 42 44.9	10.229
17	6 10 19.91	2.5167	26 5 21.1	3.179	17	8 8 17.23	2.3684	20 32 27.4	10.354
18	6 12 50.89	2.5158	26 2 5.4	3.345	18	8 10 39.20	2.3640	20 22 2.4	10.479
19	6 15 21.81	2.5148	25 58 39.7	3.511	19	8 13 0.90	2.3595	20 11 30.0	10.602
20	6 17 52.67	2.5137	25 55 4.1	3.677	20	8 15 22.34	2.3550	20 0 50.2	10.723
21	6 20 23.46	2.5126	25 51 18.5	3.842	21	8 17 43.51	2.3505	19 50 3.2	10.843
22	6 22 54.17	2.5112	25 47 23.1	4.006	22	8 20 4.40	2.3460	19 39 9.0	10.962
23	6 25 24.80	2.5097	25 43 17.9	4.169	23	8 22 25.02	2.3414	19 28 7.8	11.079
24	6 27 55.33	2.5081	N.25 39 2.8	4.332	24	8 24 45.37	2.3369	N.19 16 59.5	11.195



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 25.					SUNDAY 27.				
0	h. m. s.	s.	N. 19 16 59.5	11.198	0	h. m. s.	s.	N. 8 32 16.6	15.121
1	8 24 45.37	2.3299	19 5 44.3	11.310	1	10 12 10.95	2.1882	8 17 7.9	15.180
2	8 27 5.45	2.3294	18 54 22.3	11.424	2	10 14 20.26	2.1880	8 1 50.4	15.212
3	8 29 25.26	2.3278	18 42 53.5	11.538	3	10 16 29.43	2.1816	7 46 42.2	15.257
4	8 31 44.80	2.3233	18 31 18.0	11.647	4	10 18 38.44	2.1492	7 31 25.5	15.300
5	8 34 4.06	2.3188	18 19 35.9	11.756	5	10 20 47.33	2.1470	7 16 6.3	15.341
6	8 36 23.05	2.3143	18 7 47.3	11.864	6	10 22 56.09	2.1449	7 0 44.6	15.381
7	8 38 41.78	2.3099	17 55 52.2	11.971	7	10 25 4.78	2.1429	6 45 20.6	15.419
8	8 41 0.24	2.3055	17 43 50.8	12.078	8	10 27 13.94	2.1410	6 29 54.3	15.456
9	8 43 18.44	2.3010	17 31 43.1	12.180	9	10 29 21.64	2.1391	6 14 25.8	15.492
10	8 45 36.37	2.2965	17 19 29.2	12.282	10	10 31 29.93	2.1373	5 58 55.3	15.526
11	8 47 54.03	2.2922	17 7 9.2	12.383	11	10 33 38.19	2.1355	5 43 22.8	15.559
12	8 50 11.43	2.2878	16 54 43.2	12.483	12	10 35 46.20	2.1339	5 27 48.4	15.590
13	8 52 28.57	2.2834	16 42 11.2	12.583	13	10 37 54.19	2.1323	5 12 12.1	15.619
14	8 54 45.44	2.2791	16 29 33.4	12.678	14	10 40 2.08	2.1306	4 56 34.1	15.647
15	8 57 2.06	2.2748	16 16 49.8	12.773	15	10 42 9.89	2.1290	4 40 54.4	15.674
16	8 59 18.49	2.2705	16 4 0.6	12.867	16	10 44 17.62	2.1273	4 25 13.2	15.700
17	9 1 34.53	2.2663	15 51 5.8	12.960	17	10 46 25.27	2.1257	4 9 30.5	15.724
18	9 3 50.38	2.2621	15 38 5.4	13.051	18	10 48 32.84	2.1241	3 53 46.3	15.747
19	9 6 5.98	2.2579	15 24 59.6	13.141	19	10 50 40.35	2.1225	3 38 0.9	15.768
20	9 8 21.33	2.2537	15 11 48.5	13.229	20	10 52 47.79	2.1209	3 22 14.2	15.788
21	9 10 36.43	2.2495	14 58 32.1	13.316	21	10 54 55.18	2.1193	3 6 26.3	15.807
22	9 12 51.29	2.2453	14 45 10.6	13.402	22	10 57 2.51	2.1177	2 50 37.4	15.824
23	9 15 5.90	2.2411	N. 14 31 44.0	13.486	23	10 59 9.80	2.1161	N. 2 34 47.5	15.839
24	9 17 20.28	2.2377				11 1 17.04	2.1145		
SATURDAY 26.					MONDAY 28.				
0	9 19 34.42	2.2337	N. 14 18 12.3	13.569	0	11 3 24.24	2.1129	N. 2 18 56.7	15.853
1	9 21 48.33	2.2295	14 4 35.7	13.650	1	11 5 31.40	2.1113	2 3 5.1	15.866
2	9 24 2.00	2.2250	13 50 54.3	13.730	2	11 7 38.54	2.1108	1 47 12.8	15.877
3	9 26 15.44	2.2222	13 37 8.2	13.808	3	11 9 45.66	2.1104	1 31 19.9	15.887
4	9 28 28.66	2.2185	13 23 17.4	13.885	4	11 11 52.75	2.1181	1 15 26.4	15.896
5	9 30 41.65	2.2148	13 9 22.0	13.960	5	11 13 59.82	2.1178	0 59 32.4	15.902
6	9 32 54.43	2.2112	12 55 22.2	14.034	6	11 16 6.89	2.1177	0 43 38.1	15.908
7	9 35 6.99	2.2076	12 41 18.0	14.106	7	11 18 13.95	2.1177	0 27 43.5	15.912
8	9 37 19.34	2.2041	12 27 9.5	14.177	8	11 20 21.02	2.1178	N. 0 11 48.6	15.916
9	9 39 31.48	2.2006	12 12 56.7	14.247	9	11 22 28.09	2.1179	S. 0 4 6.4	15.917
10	9 41 43.41	2.1972	11 58 39.8	14.316	10	11 24 35.17	2.1182	0 20 1.4	15.917
11	9 43 55.14	2.1938	11 44 18.8	14.382	11	11 26 42.27	2.1185	0 35 56.4	15.915
12	9 46 6.67	2.1905	11 29 53.9	14.448	12	11 28 49.39	2.1189	0 51 51.2	15.911
13	9 48 18.01	2.1873	11 15 25.1	14.512	13	11 30 56.54	2.1192	1 7 45.8	15.907
14	9 50 29.15	2.1842	11 0 52.5	14.575	14	11 33 3.71	2.1196	1 23 40.1	15.902
15	9 52 40.11	2.1811	10 46 16.2	14.636	15	11 35 10.92	2.1204	1 39 34.0	15.896
16	9 54 50.88	2.1781	10 31 36.2	14.695	16	11 37 18.16	2.1211	1 55 27.5	15.887
17	9 57 1.47	2.1751	10 16 52.7	14.753	17	11 39 25.45	2.1219	2 11 20.4	15.877
18	9 59 11.89	2.1722	10 2 5.8	14.810	18	11 41 32.79	2.1226	2 27 12.7	15.865
19	10 1 22.14	2.1694	9 47 15.5	14.865	19	11 43 40.18	2.1237	2 43 4.2	15.852
20	10 3 32.22	2.1666	9 32 22.0	14.919	20	11 45 47.63	2.1247	2 58 54.9	15.837
21	10 5 42.13	2.1639	9 17 25.3	14.973	21	11 47 55.15	2.1258	3 14 44.6	15.821
22	10 7 51.89	2.1613	9 2 25.4	15.025	22	11 50 2.73	2.1270	3 30 33.4	15.804
23	10 10 1.50	2.1588	8 47 22.5	15.073	23	11 52 10.39	2.1283	3 46 21.1	15.786
24	10 12 10.95	2.1563	N. 8 32 16.6	15.121	24	11 54 18.13	2.1297	S. 4 2 7.6	15.765



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
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## TUESDAY 29.

	h.	m.	s.	s.	°	'	"	"	
0	11	54	18.13	2.1397	S.	4	9	7.6	15.765
1	11	56	25.95	2.1311		4	17	52.9	15.743
2	11	58	33.66	2.1336		4	33	36.8	15.720
3	12	0	41.86	2.1342		4	49	19.3	15.693
4	12	2	49.96	2.1369		5	5	0.2	15.669
5	12	4	58.16	2.1376		5	20	39.5	15.643
6	12	7	6.47	2.1394		5	36	17.2	15.613
7	12	9	14.89	2.1413		5	51	53.0	15.583
8	12	11	23.43	2.1432		6	7	27.0	15.550
9	12	13	32.08	2.1463		6	22	59.0	15.517
10	12	15	40.86	2.1474		6	38	29.0	15.493
11	12	17	49.77	2.1496		6	53	56.8	15.444
12	12	19	58.81	2.1519		7	9	22.4	15.407
13	12	22	7.99	2.1542		7	24	45.7	15.368
14	12	24	17.31	2.1566		7	40	6.6	15.328
15	12	26	26.78	2.1590		7	55	25.0	15.296
16	12	28	36.39	2.1616		8	10	40.9	15.263
17	12	30	46.16	2.1642		8	25	54.1	15.197
18	12	32	56.09	2.1669		8	41	4.5	15.150
19	12	35	6.18	2.1696		8	56	12.1	15.103
20	12	37	16.44	2.1724		9	11	16.7	15.052
21	12	39	26.87	2.1753		9	26	18.3	15.001
22	12	41	37.48	2.1783		9	41	16.8	14.949
23	12	43	48.26	2.1813	S.	9	56	12.1	14.893

## WEDNESDAY 30.

0	12 45 59.23	2.1844	S.10 11 4.0	14.887
1	12 48 10.39	2.1874	10 25 52.5	14.780
2	12 50 21.73	2.1907	10 40 37.6	14.722
3	12 52 33.27	2.1939	10 55 19.1	14.662
4	12 54 45.00	2.1973	11 9 57.0	14.600
5	12 56 56.94	2.2007	11 24 31.1	14.537
6	12 59 9.08	2.2041	11 39 1.4	14.472
7	13 1 21.43	2.2075	11 53 27.7	14.405
8	13 3 33.98	2.2111	12 7 50.0	14.337
9	13 5 46.75	2.2147	12 23 8.2	14.268
10	13 7 59.74	2.2183	12 36 22.2	14.197
11	13 10 12.95	2.2220	12 50 31.9	14.125
12	13 12 26.38	2.2258	13 4 37.2	14.051
13	13 14 40.04	2.2296	13 18 38.0	13.976
14	13 16 53.93	2.2334	13 32 34.3	13.899
15	13 19 8.05	2.2373	13 46 25.9	13.820
16	13 21 22.40	2.2412	14 0 12.7	13.740
17	13 23 36.99	2.2451	14 13 54.7	13.660
18	13 25 51.81	2.2491	14 27 31.8	13.578
19	13 28 6.88	2.2532	14 41 3.9	13.492
20	13 30 22.19	2.2573	14 54 30.8	13.406
21	13 32 37.75	2.2614	15 7 52.6	13.318
22	13 34 53.56	2.2655	15 21 0.0	13.228
23	13 37 9.61	2.2697	15 34 20.1	13.139
24	13 39 25.92	2.2739	S.15 47 25.7	13.047

## THURSDAY 31.

	h.	m.	s.	s.	°	'	"	"	
0	13	39	25.92	2.2739	S.	15	47	25.7	13.047
1	13	41	42.48	2.2781		16	0	25.7	12.958
2	13	43	59.29	2.2824		16	13	20.1	12.858
3	13	46	16.39	2.2867		16	26	8.7	12.762
4	13	48	33.69	2.2910		16	38	51.5	12.664
5	13	50	51.28	2.2953		16	51	28.4	12.566
6	13	53	9.12	2.2996		17	3	59.3	12.464
7	13	55	27.23	2.3040		17	16	24.1	12.362
8	13	57	45.60	2.3083		17	28	42.7	12.258
9	14	0	4.23	2.3127		17	40	55.0	12.153
10	14	2	23.13	2.3171		17	53	1.0	12.048
11	14	4	42.29	2.3215		18	5	0.5	11.937
12	14	7	1.71	2.3259		18	16	53.5	11.828
13	14	9	21.39	2.3303		18	28	39.8	11.717
14	14	11	41.34	2.3347		18	40	19.5	11.605
15	14	14	1.55	2.3391		18	51	52.4	11.491
16	14	16	22.03	2.3435		19	3	18.4	11.376
17	14	18	42.77	2.3479		19	14	37.5	11.259
18	14	21	3.77	2.3523		19	25	49.5	11.141
19	14	23	25.03	2.3566		19	36	54.4	11.022
20	14	25	46.56	2.3609		19	47	52.1	10.901
21	14	28	8.35	2.3652		19	58	42.5	10.779
22	14	30	30.39	2.3695		20	9	25.6	10.656
23	14	32	52.69	2.3738	S.	20	20	1.2	10.531

## FRIDAY, JUNE 1.

0	14	35	15.25	2.3781	S.	20	30	29.3	10.408
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## PHASES OF THE MOON.

	Day.	h.	m.
○ Full Moon, . . .	4	19	1.8
☾ Last Quarter, . . .	12	7	16.4
● New Moon, . . .	20	6	46.0
☾ First Quarter, . . .	27	8	4.7

	Day.	h.
☾ Perigee, . . . . .	1	23.4
☾ Apogee, . . . . .	13	20.5
☾ Perigee, . . . . .	28	15.4



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
1	Venus	W.	83 28 28	2466	85 9 58	2484	86 51 34	2480	88 33 16	2476
	Jupiter	W.	60 43 42	2217	62 31 44	2213	64 19 53	2210	66 8 6	2206
	Pollux	W.	59 13 3	2190	61 1 32	2184	62 50 8	2191	64 38 49	2186
	Saturn	W.	30 49 17	2196	32 37 51	2190	34 26 34	2186	36 15 24	2181
	Spica	E.	32 9 29	2198	30 20 51	2193	28 32 11	2192	26 43 31	2192
	Antares	E.	77 51 52	2174	76 2 45	2170	74 13 32	2167	72 24 15	2163
	Mars	E.	119 19 54	2298	117 33 51	2294	115 47 42	2289	114 1 27	2286
2	Venus	W.	97 2 46	2466	98 44 47	2466	100 26 50	2465	102 8 52	2465
	Jupiter	W.	75 10 7	2198	76 58 37	2197	78 47 9	2196	80 35 30	2196
	Pollux	W.	73 43 30	2176	75 32 34	2174	77 21 40	2175	79 10 45	2174
	Saturn	W.	45 20 46	2170	47 9 59	2169	48 59 13	2168	50 48 28	2169
	Regulus	W.	36 42 46	2166	38 32 7	2164	40 21 29	2163	42 10 53	2166
	Antares	E.	63 16 52	2166	61 27 17	2166	59 37 41	2166	57 48 6	2166
	Mars	E.	105 9 13	2277	103 22 40	2277	101 36 6	2276	99 49 30	2276
3	Jupiter	W.	89 37 43	2216	91 25 56	2214	93 14 3	2218	95 2 4	2220
	Pollux	W.	88 15 48	2186	90 4 37	2189	91 53 21	2196	93 41 59	2196
	Saturn	W.	59 54 19	2178	61 43 19	2169	63 32 13	2166	65 21 1	2160
	Regulus	W.	51 17 30	2173	53 6 40	2176	54 55 45	2179	56 44 44	2184
	Antares	E.	48 40 36	2167	46 51 18	2169	45 2 4	2174	43 12 58	2179
	Mars	E.	90 56 59	2267	89 10 40	2268	87 24 25	2264	85 38 17	2266
4	Jupiter	W.	104 0 4	2284	105 47 11	2282	107 34 6	2271	109 20 48	2270
	Saturn	W.	74 23 2	2228	76 10 56	2261	77 58 38	2226	79 46 9	2246
	Regulus	W.	65 47 42	2214	67 35 48	2208	69 23 42	2220	71 11 25	2220
	Antares	E.	34 9 26	2209	32 21 12	2216	30 33 9	2226	28 45 19	2236
	Mars	E.	76 49 30	2280	75 4 14	2286	73 19 10	2246	71 34 17	2264
	$\alpha$ Aquilæ	E.	69 12 22	2282	67 38 23	2281	66 4 36	2242	64 31 3	2265
5	Saturn	W.	86 40 13	2296	90 26 15	2210	92 12 0	2222	93 57 28	2236
	Regulus	W.	80 6 31	2289	81 52 46	2201	83 38 44	2213	85 24 24	2226
	Spica	W.	26 7 41	2211	27 53 24	2220	29 38 54	2230	31 24 10	2241
	Mars	E.	62 53 17	2406	61 9 51	2417	59 26 41	2420	57 43 49	2441
	$\alpha$ Aquilæ	E.	76 47 59	2241	75 16 32	2268	73 45 33	2267	72 15 4	2213
	Fomalhaut	E.	101 9 54	2296	99 32 31	2278	97 55 18	2264	96 18 17	2264
6	Saturn	W.	102 40 4	2402	104 23 36	2416	106 6 48	2431	107 49 38	2420
	Regulus	W.	94 8 8	2406	95 51 54	2208	97 35 21	2420	99 18 27	2425
	Spica	W.	40 6 29	2401	41 50 3	2414	43 33 18	2426	45 16 13	2442
	Mars	E.	49 13 58	2610	47 32 58	2624	45 52 18	2638	44 11 58	2646
	$\alpha$ Aquilæ	E.	64 51 22	2171	63 24 38	2200	61 58 40	2220	60 33 30	2234
	Fomalhaut	E.	88 16 54	2766	86 41 31	2773	85 6 28	2790	83 31 47	2806
7	Spica	W.	53 45 36	2617	55 26 27	2623	57 6 55	2646	58 47 2	2664
	Mars	E.	35 55 41	2622	34 17 30	2646	32 39 40	2664	31 2 12	2681
	$\alpha$ Aquilæ	E.	53 41 24	2660	52 22 5	2684	51 3 57	2698	49 47 3	2708
	Fomalhaut	E.	75 44 25	2907	74 12 15	2961	72 40 35	2964	71 9 24	2978
	$\alpha$ Pegasi	E.	96 45 49	2976	95 8 37	2992	93 31 46	2707	91 55 15	2722
8	Spica	W.	67 2 6	2644	68 40 1	2669	70 17 36	2675	71 54 49	2691
	Antares	W.	21 11 37	2638	22 49 41	2663	24 27 24	2670	26 4 44	2686
	Fomalhaut	E.	63 41 31	3114	62 13 39	3146	60 46 25	3178	59 19 49	3212
	$\alpha$ Pegasi	E.	83 58 1	2806	82 23 40	2822	80 49 41	2840	79 16 5	2850
	SUN	E.	138 58 29	3006	137 28 26	3024	135 58 43	3039	134 29 18	3066



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XV <sup>h</sup> .	P. L. of Dist.	XVIII <sup>h</sup> .	P. L. of Dist.	XXI <sup>h</sup> .	P. L. of Dist.
1	Venus W.	90 15 3	2478	91 56 54	2471	93 38 48	2468	95 20 46	2467
	Jupiter W.	67 56 24	2304	69 44 46	2302	71 33 10	2300	73 21 38	2190
	Pollux W.	66 27 37	2160	68 16 30	2160	70 5 27	2178	71 54 27	2176
	Saturn W.	38 4 20	2178	39 53 21	2176	41 42 26	2173	43 31 35	2171
	Spica E.	24 54 51	2188	23 6 13	2186	21 17 40	2202	19 29 14	2208
	Antares E.	70 34 53	2161	68 45 27	2160	66 55 58	2157	65 6 26	2156
	Mars E.	112 15 7	2384	110 28 44	2381	108 42 17	2379	106 55 46	2377
2	Venus W.	103 50 54	2467	105 32 54	2468	107 14 52	2470	108 56 47	2471
	Jupiter W.	62 24 9	2300	64 12 37	2301	66 1 3	2304	67 49 24	2306
	Pollux W.	80 59 51	2176	82 48 54	2178	84 37 55	2179	86 26 54	2182
	Saturn W.	52 37 43	2170	54 26 56	2171	56 16 7	2173	58 5 15	2176
	Regulus W.	44 0 16	2164	45 49 38	2166	47 38 58	2167	49 28 16	2169
	Antares E.	55 58 30	2167	54 8 58	2166	52 19 27	2160	50 30 0	2163
	Mars E.	98 2 55	2377	96 16 22	2379	94 29 52	2380	92 43 23	2383
3	Jupiter W.	96 49 58	2329	98 37 43	2334	100 25 20	2341	102 12 47	2347
	Pollux W.	95 30 30	2284	97 18 52	2289	99 7 6	2316	100 55 10	2328
	Saturn W.	67 9 43	2196	68 58 16	2202	70 46 40	2208	72 34 56	2214
	Regulus W.	58 33 36	2168	60 22 21	2184	62 10 57	2200	63 59 24	2206
	Antares E.	41 23 58	2184	39 35 7	2189	37 46 23	2196	35 57 50	2202
	Mars E.	83 52 14	2364	82 6 20	2369	80 20 34	2315	78 34 57	2322
4	Jupiter W.	111 7 18	2369	112 53 33	2360	114 39 33	2310	116 25 18	2320
	Saturn W.	81 33 28	2267	83 20 31	2266	85 7 20	2276	86 53 55	2287
	Regulus W.	72 58 55	2246	74 46 11	2248	76 33 12	2268	78 19 59	2278
	Antares E.	26 57 43	2245	25 10 22	2266	23 23 16	2286	21 36 26	2277
	Mars E.	69 49 36	2364	68 5 10	2374	66 20 58	2383	64 36 59	2386
	α Aquilæ E.	82 57 46	2369	81 24 47	2364	79 52 8	2303	78 19 52	2320
5	Saturn W.	95 42 37	2347	97 27 28	2360	99 12 0	2374	100 56 12	2386
	Regulus W.	87 9 47	2286	88 54 51	2300	90 39 37	2366	92 24 2	2378
	Spica W.	33 9 11	2361	34 53 56	2362	36 38 25	2374	38 22 36	2387
	Mars E.	56 1 13	2466	54 18 56	2468	52 36 58	2481	50 55 18	2496
	α Aquilæ E.	70 45 6	2640	69 15 43	2669	67 46 56	2109	66 18 49	2125
	Fomalhaut E.	94 41 28	2704	93 4 55	2716	91 28 37	2729	89 52 36	2744
6	Saturn W.	109 32 7	2462	111 14 14	2477	112 56 0	2492	114 37 24	2508
	Regulus W.	101 1 12	2450	102 43 35	2466	104 25 36	2482	106 7 15	2497
	Spica W.	46 58 47	2467	48 41 1	2471	50 22 55	2487	52 4 27	2502
	Mars E.	42 32 1	2609	40 52 23	2608	39 13 8	2600	37 34 13	2617
	α Aquilæ E.	59 9 11	2340	57 45 46	2389	56 23 17	2443	55 1 49	2499
	Fomalhaut E.	81 57 29	2826	80 23 35	2846	78 50 5	2866	77 17 2	2886
7	Spica W.	60 26 46	2660	62 6 9	2666	63 45 10	2612	65 23 49	2628
	Mars E.	29 25 6	2696	27 48 22	2713	26 12 1	2730	24 36 1	2748
	α Aquilæ E.	48 31 28	2630	47 17 17	2637	46 4 35	2631	44 53 26	2632
	Fomalhaut E.	69 38 44	2608	68 8 35	2609	66 38 59	2607	65 9 57	2607
	α Pegasi E.	90 19 5	2729	88 43 17	2765	87 7 50	2771	85 32 44	2788
8	Spica W.	73 31 41	2707	75 8 12	2723	76 44 22	2738	78 20 13	2758
	Antares W.	27 41 44	2700	29 18 24	2718	30 54 40	2732	32 30 37	2747
	Fomalhaut E.	57 53 54	2346	56 28 39	2362	55 4 7	2320	53 40 19	2360
	α Pegasi E.	77 42 53	2676	76 10 3	2694	74 37 36	2612	73 5 33	2680
	SUN E.	133 0 14	3070	131 31 28	3066	130 3 1	3101	128 34 52	3117



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>	
9	Spica W.	79 55 49	2768	81 30 52	2768	83 5 42	2798	84 40 13	2812
	Antares W.	34 6 14	2768	35 41 31	2778	37 16 28	2792	38 51 6	2807
	Fomalhaut E.	52 17 17	2408	50 55 4	2446	49 33 40	2494	48 13 9	2545
	α Pegasi E.	71 33 52	2949	70 2 35	2996	68 31 42	2986	67 1 19	3005
	SUN E.	127 7 3	3123	125 39 33	3147	124 12 20	3162	122 45 25	3178
10	Spica W.	92 28 13	2880	94 0 57	2888	95 33 25	2905	97 5 37	2916
	Antares W.	46 39 41	2976	48 12 31	2987	49 45 7	2990	51 17 26	2993
	Fomalhaut E.	41 45 29	2688	40 31 21	2629	39 18 31	4014	38 7 5	4105
	α Pegasi E.	59 34 42	3104	58 6 37	3124	56 38 57	3144	55 11 41	3166
	SUN E.	115 35 14	3248	114 10 2	3261	112 45 5	3274	111 20 23	3287
11	Spica W.	104 42 59	2972	106 13 47	2981	107 44 23	2991	109 14 47	3000
	Antares W.	58 55 23	2986	60 26 18	2976	61 57 1	2985	63 27 33	2998
	α Pegasi E.	48 1 59	3282	46 37 26	3296	45 13 24	3285	43 49 53	3263
	SUN E.	104 20 27	3246	102 57 7	3254	101 33 58	3264	100 11 0	3272
12	Antares W.	70 57 40	3080	72 27 15	3087	73 56 42	3043	75 26 2	3047
	Mars W.	25 21 12	3180	26 48 10	3164	28 15 2	3170	29 41 47	3174
	SUN E.	93 18 40	3408	91 56 38	3420	90 34 44	3426	89 12 56	3431
13	Antares W.	82 51 25	3065	84 20 17	3087	85 49 7	3080	87 17 54	3089
	Mars W.	36 54 22	3191	38 20 42	3193	39 47 0	3194	41 13 16	3194
	SUN E.	82 25 17	3450	81 3 57	3453	79 42 40	3454	78 21 24	3456
14	Antares W.	94 41 42	3089	96 10 30	3088	97 39 19	3066	99 8 11	3068
	Mars W.	48 24 33	3192	49 50 51	3189	51 17 13	3188	52 43 36	3184
	α Aquilæ W.	48 3 10	4206	49 9 57	4261	50 17 35	4197	51 26 4	4189
	SUN E.	71 35 23	3456	70 14 9	3454	68 52 54	3452	67 31 36	3449
15	Antares W.	106 33 28	3044	108 2 46	3089	109 32 11	3054	111 1 42	3028
	Mars W.	59 56 39	3164	61 23 31	3166	62 50 31	3162	64 17 38	3147
	α Aquilæ W.	57 19 11	3947	58 31 43	3916	59 44 48	3882	60 58 26	3854
	SUN E.	60 44 15	3431	59 22 34	3426	58 0 47	3420	56 38 53	3416
16	Mars W.	71 35 10	3110	73 3 8	3101	74 31 16	3092	75 59 35	3083
	α Aquilæ W.	67 13 51	3722	68 30 15	3696	69 47 4	3677	71 4 16	3655
	Fomalhaut W.	42 10 44	3898	43 24 6	3841	44 38 26	3798	45 53 41	3739
	SUN E.	49 47 42	3282	48 25 5	3274	47 2 19	3266	45 39 24	3256
17	Mars W.	83 23 59	3084	84 53 29	3025	86 23 11	3014	87 53 7	3004
	α Aquilæ W.	77 35 39	3563	78 54 54	3545	80 14 28	3529	81 34 20	3515
	Fomalhaut W.	52 21 48	3898	53 41 30	3806	55 1 49	3472	56 22 44	3441
	SUN E.	38 42 32	3318	37 18 41	3300	35 54 40	3290	34 30 29	3284
22	SUN W.	21 25 48	2920	22 57 41	2901	24 29 59	2881	26 2 42	2864
	Jupiter E.	29 49 24	2559	28 9 33	2561	26 29 30	2543	24 49 16	2526
	Saturn E.	57 19 7	2828	55 38 30	2819	53 57 43	2811	52 16 45	2804
	Regulus E.	65 10 25	2807	63 29 21	2499	61 48 6	2490	60 6 39	2482
23	SUN W.	33 51 8	2798	35 25 39	2788	37 0 23	2778	38 35 20	2768
	Saturn E.	43 49 19	2469	42 7 21	2469	40 25 15	2466	38 43 0	2459
	Regulus E.	51 36 44	2446	49 54 15	2440	48 11 37	2423	46 28 50	2426
	Spica E.	105 40 10	2445	103 57 39	2428	102 14 58	2421	100 32 7	2424



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
9	Spica W.	86 14 25	2937	87 48 18	2941	89 21 53	2934	90 55 11	2936
	Antares W.	40 25 25	2931	41 59 25	2926	43 33 7	2948	45 6 33	2962
	Fomalhaut E.	46 53 34	2968	45 34 57	2954	44 17 21	2715	43 0 50	2782
	α Pegasi E.	65 31 6	2925	64 1 24	2944	62 32 6	2964	61 3 12	2983
	SUN E.	121 18 49	2192	119 52 30	2208	118 26 28	2220	117 0 43	2234
10	Spica W.	98 37 35	2929	100 9 17	2940	101 40 45	2951	103 11 59	2962
	Antares W.	52 49 30	2924	54 21 19	2926	55 52 54	2948	57 24 15	2956
	Fomalhaut E.	36 57 8	2906	35 48 48	2918	34 42 12	2440	33 37 27	2479
	α Pegasi E.	53 44 51	2188	52 18 28	2210	50 52 31	2233	49 27 1	2257
	SUN E.	109 55 56	2800	106 31 44	2811	107 7 45	2822	105 43 59	2834
11	Spica W.	110 45 0	2909	112 15 2	2916	113 44 55	2924	115 14 38	2930
	Antares W.	64 57 54	2902	66 28 4	2909	67 58 5	2917	69 27 57	2924
	α Pegasi E.	42 26 54	2908	41 4 30	2925	39 42 42	2461	38 21 34	2497
	SUN E.	98 48 13	2892	97 25 36	2891	96 3 9	2899	94 40 51	2905
12	Antares W.	76 55 17	2962	78 24 26	2966	79 53 30	2969	81 22 30	2968
	Mars W.	31 8 27	2178	32 35 2	2182	34 1 33	2185	35 27 59	2188
	SUN E.	87 51 14	2426	86 29 38	2440	85 8 7	2444	83 46 40	2447
13	Antares W.	89 46 41	2971	90 15 26	2971	91 44 11	2970	93 12 57	2971
	Mars W.	42 39 31	2196	44 5 45	2196	45 32 0	2194	46 58 16	2198
	SUN E.	77 0 11	2457	75 38 59	2457	74 17 47	2457	72 56 35	2457
14	Antares W.	100 37 6	2968	102 6 5	2967	103 35 7	2962	105 4 15	2968
	Mars W.	54 10 4	2182	55 36 35	2178	57 3 11	2173	58 29 52	2168
	α Aquilæ W.	52 35 18	2404	53 45 16	2401	54 55 56	2401	56 7 15	2398
	SUN E.	66 10 15	2446	64 48 51	2442	63 27 23	2439	62 5 51	2436
15	Antares W.	112 31 20	2922	114 1 5	2917	115 30 57	2910	117 0 57	2904
	Mars W.	65 44 51	2139	67 12 13	2133	68 39 43	2125	70 7 22	2118
	α Aquilæ W.	62 12 34	2924	63 27 12	2796	64 42 18	2770	65 57 51	2745
	SUN E.	55 16 53	2409	53 54 47	2402	52 32 33	2396	51 10 12	2390
16	Mars W.	77 28 5	2975	78 56 45	2965	80 25 38	2965	81 54 43	2966
	α Aquilæ W.	72 21 51	2935	73 39 47	2915	74 58 5	2898	76 16 42	2879
	Fomalhaut W.	47 9 47	2908	48 26 41	2950	49 44 21	2911	51 2 43	2872
	SUN E.	44 16 20	2351	42 53 7	2342	41 29 45	2335	40 6 13	2326
17	Mars W.	89 23 15	2968	90 53 37	2961	92 24 13	2959	93 55 4	2957
	α Aquilæ W.	82 54 28	2900	84 14 52	2896	85 35 33	2872	86 56 28	2861
	Fomalhaut W.	57 44 14	2414	59 6 15	2386	60 28 47	2360	61 51 49	2335
	SUN E.	33 6 10	2386	31 41 41	2377	30 17 3	2370	28 52 16	2364
22	SUN W.	27 35 47	2948	29 9 12	2935	30 42 54	2922	32 16 53	2910
	Jupiter E.	23 8 52	2927	21 28 16	2919	19 47 29	2912	18 6 32	2905
	Saturn E.	50 35 37	2486	48 54 17	2488	47 12 47	2482	45 31 8	2476
	Regulus E.	58 25 1	2476	56 43 12	2467	55 1 13	2460	53 19 3	2453
23	SUN W.	40 10 32	2759	41 45 54	2750	43 21 28	2741	44 57 14	2733
	Saturn E.	37 0 36	2445	35 18 5	2440	33 35 27	2436	31 52 43	2432
	Regulus E.	44 45 53	2421	43 2 48	2415	41 19 35	2410	39 36 14	2405
	Spica E.	98 49 6	2418	97 5 57	2412	95 22 39	2406	93 39 13	2400



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
24	SUN W.	46 33 10	2726	48 9 10	2718	49 45 32	2711	51 21 57	2704
	Saturn E.	30 9 54	2428	28 26 59	2425	26 44 0	2422	25 0 57	2422
	Regulus E.	37 52 46	2400	36 9 11	2396	34 25 30	2391	32 41 42	2387
	Spica E.	91 55 38	2394	90 11 54	2388	88 28 2	2382	86 44 2	2378
25	SUN W.	59 26 11	2674	61 3 26	2669	62 40 48	2663	64 18 17	2659
	Venus W.	15 23 13	2629	17 0 28	2621	18 38 55	2613	20 17 32	2607
	Regulus E.	24 1 31	2576	22 17 20	2575	20 33 9	2577	18 49 1	2563
	Spica E.	78 2 15	2543	76 17 33	2549	74 32 45	2545	72 47 51	2541
26	SUN W.	72 27 14	2637	74 5 19	2633	75 43 29	2629	77 21 45	2626
	Venus W.	28 32 51	2677	30 12 17	2672	31 51 51	2668	33 31 30	2664
	Pollux W.	27 39 48	2407	29 23 13	2394	31 6 56	2384	32 50 54	2378
	Jupiter W.	24 44 52	2373	26 29' 5	2370	28 13 23	2366	29 57 46	2363
	Spica E.	64 1 57	2328	62 16 31	2320	60 31 1	2317	58 45 27	2314
	Antares E.	109 48 10	2316	108 2 34	2313	106 16 54	2309	104 31 8	2306
27	SUN W.	85 34 9	2610	87 12 50	2607	88 51 35	2605	90 30 23	2603
	Pollux W.	41 33 53	2338	43 18 57	2333	45 4 8	2329	46 49 27	2324
	Venus W.	41 51 9	2645	43 31 19	2643	45 11 34	2638	46 51 54	2633
	Jupiter W.	38 40 46	2349	40 25 34	2347	42 10 25	2345	43 55 19	2343
	Spica E.	49 56 38	2303	48 10 43	2301	46 24 45	2300	44 38 45	2298
	Antares E.	95 41 15	2298	93 55 5	2291	92 8 52	2289	90 23 36	2286
28	SUN W.	98 45 6	2694	100 24 9	2693	102 3 14	2692	103 42 20	2691
	Pollux W.	55 37 24	2307	57 23 13	2306	59 9 5	2303	60 55 0	2301
	Venus W.	55 14 28	2624	56 55 9	2622	58 35 52	2620	60 16 37	2617
	Jupiter W.	52 40 31	2335	54 25 40	2334	56 10 50	2332	57 56 3	2331
	Saturn W.	26 4 59	2323	27 50 25	2320	29 35 56	2315	31 21 33	2313
	Spica E.	35 48 22	2296	34 2 16	2296	32 16 11	2297	30 30 7	2296
	Antares E.	81 30 30	2278	79 43 58	2277	77 57 25	2276	76 10 50	2274
29	SUN W.	111 58 5	2689	113 37 15	2680	115 16 24	2681	116 55 31	2681
	Pollux W.	69 45 9	2296	71 31 14	2296	73 17 20	2296	75 3 26	2296
	Venus W.	68 40 55	2613	70 21 50	2613	72 2 45	2612	73 43 41	2612
	Jupiter W.	66 42 19	2330	68 27 35	2331	70 12 50	2331	71 58 5	2331
	Saturn W.	40 10 24	2306	41 56 16	2304	43 42 9	2304	45 28 2	2304
	Regulus W.	32 43 36	2287	34 29 55	2286	36 16 15	2285	38 2 36	2285
	Antares E.	67 17 39	2273	65 31 0	2273	63 44 21	2273	61 57 42	2274
	Mars E.	117 35 58	2239	115 50 55	2239	114 5 52	2239	112 20 49	2239
30	Pollux W.	83 53 43	2301	85 39 41	2302	87 25 37	2306	89 11 29	2308
	Venus W.	82 8 14	2616	83 49 5	2617	85 20 54	2620	87 10 40	2620
	Jupiter W.	80 44 0	2337	82 29 5	2340	84 14 6	2342	85 59 4	2344
	Saturn W.	54 17 21	2309	56 3 8	2310	57 48 52	2312	59 34 34	2315
	Regulus W.	46 54 19	2283	48 40 36	2290	50 26 50	2291	52 13 2	2294
	Antares E.	53 4 50	2281	51 18 22	2283	49 31 57	2285	47 45 35	2287
	Mars E.	103 35 45	2244	101 50 49	2245	100 5 55	2247	98 21 4	2248
31	Venus W.	95 33 45	2635	97 14 9	2639	98 54 28	2643	100 34 41	2646
	Jupiter W.	94 42 55	2362	96 27 25	2366	98 11 49	2371	99 56 6	2373
	Saturn W.	68 22 3	2331	70 7 18	2336	71 52 27	2339	73 37 30	2344
	Regulus W.	61 3 6	2309	62 48 52	2313	64 34 33	2317	66 20 7	2322
	Antares E.	38 54 46	2304	37 8 52	2308	35 23 4	2313	33 37 23	2316
	Mars E.	89 37 42	2264	87 53 16	2268	86 8 55	2273	84 24 41	2275



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXTh.	P. L. of Diff.
24	SUN W.	59 58 31	2688	54 35 14	2689	56 12 5	2686	57 49 4	2680
	Saturn E.	23 17 53	2421	21 34 48	2422	19 51 45	2424	18 8 45	2431
	Regulus E.	30 57 48	2383	29 13 49	2380	27 29 46	2378	25 45 40	2376
	Spica E.	84 59 55	2373	83 15 41	2367	81 31 19	2364	79 46 50	2358
25	SUN W.	65 55 52	2654	67 33 34	2650	69 11 21	2645	70 49 15	2641
	Venus W.	21 56 19	2599	23 35 16	2598	25 14 20	2598	26 53 32	2598
	Regulus E.	17 5 0	2385	15 21 10	2400	13 37 35	2415	11 54 21	2433
	Spica E.	71 2 51	2337	69 17 46	2338	67 32 35	2330	65 47 19	2326
26	SUN W.	79 0 5	2623	80 38 30	2630	82 16 58	2616	83 55 32	2613
	Venus W.	35 11 15	2589	36 51 6	2566	38 31 2	2562	40 11 3	2548
	Pollux W.	34 35 7	2364	36 19 33	2357	38 4 9	2350	30 48 56	2343
	Jupiter W.	31 42 14	2360	33 26 46	2367	35 11 22	2356	36 56 2	2354
	Spica E.	56 59 48	2312	55 14 6	2309	53 28 20	2307	51 42 30	2306
	Antares E.	102 45 17	2303	100 59 22	2301	99 13 24	2298	97 27 23	2296
27	SUN W.	92 9 14	2601	93 48 8	2600	95 27 5	2597	97 6 4	2596
	Pollux W.	48 34 52	2320	50 20 23	2317	52 5 58	2313	53 51 39	2310
	Venus W.	48 32 18	2338	50 12 45	2330	51 53 16	2327	53 33 51	2325
	Jupiter W.	45 40 16	2341	47 25 16	2339	49 10 19	2337	50 55 24	2336
	Spica E.	42 52 43	2297	41 6 39	2297	39 20 35	2295	37 34 28	2296
	Antares E.	88 36 16	2294	86 49 53	2293	85 3 28	2291	83 17 1	2279
28	SUN W.	105 21 28	2591	107 0 36	2590	108 39 45	2589	110 18 55	2589
	Pollux W.	62 40 58	2300	64 26 58	2298	66 13 0	2297	67 59 4	2296
	Venus W.	61 57 26	2317	63 38 16	2316	65 19 7	2316	67 0 0	2313
	Jupiter W.	59 41 17	2331	61 26 31	2331	63 11 46	2330	64 57 2	2329
	Saturn W.	33 7 14	2311	34 52 58	2309	36 38 45	2307	38 24 34	2307
	Spica E.	28 44 5	2300	26 58 6	2304	25 12 12	2307	23 26 23	2313
	Antares E.	74 24 13	2274	72 37 36	2273	70 50 57	2274	69 4 19	2272
29	SUN W.	118 34 38	2598	120 13 43	2594	121 52 46	2596	123 31 46	2599
	Pollux W.	76 49 32	2296	78 35 37	2297	80 21 41	2298	82 7 43	2300
	Venus W.	75 24 37	2512	77 5 33	2512	78 46 28	2514	80 27 22	2515
	Jupiter W.	73 43 19	2332	75 28 32	2333	77 13 44	2335	78 58 53	2336
	Saturn W.	47 13 57	2304	48 59 50	2306	50 45 42	2307	52 31 32	2308
	Regulus W.	39 48 58	2395	41 35 20	2395	43 21 41	2396	45 8 1	2397
	Antares E.	60 11 5	2275	58 24 29	2276	56 37 54	2277	54 51 21	2279
	Mars E.	110 35 47	2239	108 50 45	2239	107 5 43	2241	105 20 43	2242
30	Pollux W.	90 57 17	2310	93 43 2	2313	94 28 42	2317	96 14 17	2321
	Venus W.	88 51 25	2322	90 32 6	2326	92 12 43	2329	93 53 16	2332
	Jupiter W.	87 44 0	2348	89 28 50	2350	91 13 37	2353	92 58 19	2357
	Saturn W.	61 20 12	2317	63 5 47	2320	64 51 17	2324	66 36 42	2326
	Regulus W.	53 59 11	2296	55 45 16	2299	57 31 17	2302	59 17 14	2305
	Antares E.	45 59 10	2289	44 13 1	2293	42 26 51	2296	40 40 46	2300
	Mars E.	96 36 15	2251	94 51 30	2255	93 6 50	2257	91 22 14	2260
31	Venus W.	102 14 48	2553	103 54 48	2556	105 34 43	2563	107 14 29	2568
	Jupiter W.	101 40 17	2380	103 24 20	2386	105 8 15	2391	106 52 2	2398
	Saturn W.	75 22 26	2348	77 7 15	2354	78 51 56	2359	80 36 29	2366
	Regulus W.	68 5 35	2327	69 50 55	2332	71 36 8	2337	73 21 14	2344
	Antares E.	31 51 47	2292	30 6 20	2297	28 21 0	2303	26 35 48	2309
	Mars E.	82 40 31	2282	80 56 30	2287	79 12 36	2292	77 28 50	2298



## AT GREENWICH APPARENT NOON.

AT GREENWICH APPARENT NOON.											
Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from		Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.	added to Apparent Time.				
							h. m. s.		s.	m. s.	
Fri.	1	4 38 18.61	10.233	N.22° 7' 49.5"	19.94	15' 48.24"	68.44	2 26.77	0.376		
Sat.	2	4 42 24.42	10.249	22 15 36.5	18.98	15 48.11	68.49	2 17.54	0.391		
Sun.	3	4 46 30.60	10.264	22 23 0.4	18.01	15 47.98	68.54	2 7.94	0.406		
Mon.	4	4 50 37.14	10.278	22 30 1.0	17.03	15 47.85	68.59	1 57.99	0.421		
Tues.	5	4 54 44.02	10.292	22 36 38.0	16.04	15 47.73	68.64	1 47.70	0.435		
Wed.	6	4 58 51.22	10.305	22 42 51.2	15.06	15 47.61	68.68	1 37.08	0.448		
Thur.	7	5 2 58.74	10.318	22 48 40.5	14.06	15 47.49	68.72	1 26.15	0.461		
Fri.	8	5 7 6.56	10.330	22 54 5.9	13.06	15 47.38	68.76	1 14.92	0.473		
Sat.	9	5 11 14.67	10.341	22 59 7.3	12.05	15 47.27	68.80	1 3.39	0.485		
Sun.	10	5 15 23.04	10.351	23 3 44.5	11.04	15 47.17	68.83	0 51.61	0.495		
Mon.	11	5 19 31.65	10.361	23 7 57.3	10.02	15 47.07	68.86	0 39.60	0.505		
Tues.	12	5 23 40.48	10.371	23 11 45.6	9.00	15 46.98	68.89	0 27.37	0.514		
Wed.	13	5 27 49.51	10.378	23 15 9.4	7.98	15 46.90	68.91	0 14.93	0.522		
Thur.	14	5 31 58.71	10.384	23 18 8.7	6.96	15 46.82	68.93	0 2.32	0.528		
Fri.	15	5 36 8.06	10.389	23 20 43.3	5.93	15 46.74	68.94	0 10.44	0.534		
Sat.	16	5 40 17.54	10.394	23 22 53.2	4.90	15 46.66	68.95	0 23.32	0.538		
Sun.	17	5 44 27.10	10.398	23 24 38.3	3.96	15 46.59	68.96	0 36.28	0.542		
Mon.	18	5 48 36.73	10.400	23 25 58.6	2.82	15 46.53	68.97	0 49.32	0.544		
Tues.	19	5 52 46.41	10.400	23 26 54.0	1.79	15 46.47	68.97	1 2.40	0.546		
Wed.	20	5 56 56.11	10.399	23 27 24.6	0.76	15 46.42	68.97	1 15.50	0.546		
Thur.	21	6 1 5.79	10.398	23 27 30.3	0.28	15 46.37	68.97	1 28.58	0.545		
Fri.	22	6 5 15.42	10.396	23 27 11.2	1.32	15 46.23	68.96	1 41.62	0.543		
Sat.	23	6 9 24.98	10.394	23 26 27.2	2.35	15 46.29	68.96	1 54.59	0.539		
Sun.	24	6 13 34.45	10.390	23 25 18.5	3.38	15 46.26	68.96	2 7.47	0.534		
Mon.	25	6 17 43.80	10.385	23 23 45.1	4.40	15 46.24	68.95	2 20.22	0.528		
Tues.	26	6 21 52.99	10.379	23 21 47.0	5.43	15 46.22	68.93	2 32.81	0.521		
Wed.	27	6 26 2.00	10.370	23 19 24.3	6.45	15 46.20	68.90	2 45.24	0.514		
Thur.	28	6 30 10.82	10.362	23 16 37.2	7.47	15 46.18	68.87	2 57.47	0.506		
Fri.	29	6 34 19.44	10.353	23 13 25.7	8.49	15 46.17	68.84	3 9.49	0.496		
Sat.	30	6 38 27.83	10.343	23 9 49.7	9.50	15 46.16	68.81	3 21.29	0.486		
Sun.	31	6 42 35.96	10.332	N.23 5 49.4	10.51	15 46.15	68.78	3 32.84	0.475		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sideral Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be added to		Diff. for 1 hour.	Sidereal Time.					
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.	subtracted from Mean Time.								
		h.	m.	s.	s.	N.	°	'	"	s.	m.	s.	s.	h.	m.	s.
Fri.	1	4	38	19.03	10.233	N.22	7	50.3	19.94	2	26.76	0.376	4	40	45.79	
Sat.	2	4	42	24.81	10.249	22	15	37.2	18.98	2	17.53	0.391	4	44	42.34	
Sun.	3	4	46	30.96	10.264	22	23	1.0	18.01	2	7.94	0.406	4	48	38.90	
Mon.	4	4	50	37.48	10.278	22	30	1.5	17.03	1	57.98	0.421	4	52	35.46	
Tues.	5	4	54	44.38	10.292	22	36	38.4	16.04	1	47.69	0.435	4	56	32.02	
Wed.	6	4	58	51.50	10.305	22	42	51.5	15.06	1	37.07	0.448	5	0	28.57	
Thur.	7	5	2	58.99	10.318	22	48	40.8	14.06	1	26.14	0.461	5	4	25.13	
Fri.	8	5	7	6.78	10.330	22	54	6.2	13.06	1	14.91	0.473	5	8	21.69	
Sat.	9	5	11	14.86	10.341	22	59	7.5	12.06	1	3.39	0.485	5	12	18.25	
Sun.	10	5	15	23.20	10.351	23	3	44.6	11.04	0	51.61	0.495	5	16	14.81	
Mon.	11	5	19	31.77	10.361	23	7	57.3	10.02	0	39.60	0.505	5	20	11.37	
Tues.	12	5	23	40.56	10.370	23	11	45.6	9.00	0	27.37	0.514	5	24	7.93	
Wed.	13	5	27	49.55	10.378	23	15	9.4	7.98	0	14.93	0.522	5	28	4.48	
Thur.	14	5	31	58.72	10.384	23	18	8.7	6.96	0	2.32	0.528	5	32	1.04	
Fri.	15	5	36	8.04	10.389	23	20	43.3	5.93	0	10.44	0.534	5	35	57.60	
Sat.	16	5	40	17.48	10.394	23	22	53.2	4.90	0	23.32	0.538	5	39	54.16	
Sun.	17	5	44	27.00	10.398	23	24	38.3	3.86	0	36.28	0.542	5	43	50.72	
Mon.	18	5	48	36.59	10.400	23	25	58.6	2.83	0	49.31	0.544	5	47	47.28	
Tues.	19	5	52	46.23	10.400	23	26	54.0	1.79	1	2.39	0.546	5	51	43.84	
Wed.	20	5	56	55.89	10.399	23	27	24.6	0.76	1	15.49	0.546	5	55	40.40	
Thur.	21	6	1	5.53	10.398	23	27	30.3	0.28	1	28.57	0.545	5	59	36.96	
Fri.	22	6	5	15.12	10.396	23	27	11.2	1.32	1	41.61	0.543	6	3	33.51	
Sat.	23	6	9	24.64	10.394	23	26	27.3	2.35	1	54.57	0.539	6	7	30.07	
Sun.	24	6	13	34.08	10.390	23	25	18.6	3.88	2	7.45	0.534	6	11	26.63	
Mon.	25	6	17	43.39	10.385	23	23	45.2	4.40	2	20.20	0.528	6	15	23.19	
Tues.	26	6	21	52.54	10.378	23	21	47.2	5.43	2	32.79	0.521	6	19	19.75	
Wed.	27	6	26	1.52	10.370	23	19	24.6	6.45	2	45.22	0.514	6	23	16.30	
Thur.	28	6	30	10.31	10.362	23	16	37.6	7.47	2	57.45	0.506	6	27	12.86	
Fri.	29	6	34	18.89	10.353	23	13	26.1	8.49	3	9.47	0.496	6	31	9.42	
Sat.	30	6	38	27.25	10.343	23	9	50.2	9.50	3	21.27	0.486	6	35	5.98	
Sun.	31	6	42	35.35	10.332	N.23	5	50.0	10.51	3	32.82	0.475	6	39	2.53	

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

		THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
Day of the Month.	Day of the Year.	True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	153	71° 8' 55.5	8 21.4	143.58	—0.17	0.0062577	24.6	19 16 4.30	
2	154	72 6 20.7	5 46.4	143.53	0.15	.0063163	24.0	19 12 8.39	
3	155	73 3 44.9	3 10.4	143.49	0.10	.0063736	23.5	19 8 12.48	
4	156	74 1 8.2	0 33.5	143.45	—0.02	.0064296	23.0	19 4 16.57	
5	157	74 58 30.6	57 55.8	143.42	+0.08	.0064843	22.5	19 0 20.66	
6	158	75 55 52.3	55 17.3	143.39	0.21	.0065378	22.0	18 56 24.75	
7	159	76 53 13.3	52 38.1	143.36	0.33	.0065899	21.4	18 52 28.83	
8	160	77 50 33.8	49 58.4	143.34	0.46	.0066406	20.8	18 48 32.92	
9	161	78 47 53.7	47 18.1	143.32	0.58	.0066898	20.1	18 44 37.01	
10	162	79 45 13.2	44 37.5	143.30	0.71	.0067373	19.3	18 40 41.10	
11	163	80 42 32.3	41 56.4	143.28	0.80	.0067829	18.5	18 36 45.19	
12	164	81 39 50.9	39 14.8	143.26	0.88	.0068266	17.7	18 32 49.27	
13	165	82 37 9.1	36 32.8	143.25	0.93	.0068683	16.9	18 28 53.36	
14	166	83 34 26.9	33 50.4	143.24	0.93	.0069078	16.0	18 24 57.45	
15	167	84 31 44.4	31 7.7	143.23	0.92	.0069450	15.0	18 21 1.54	
16	168	85 29 1.6	28 24.7	143.22	0.89	.0069796	13.9	18 17 5.62	
17	169	86 26 18.5	25 41.4	143.20	0.82	.0070116	12.8	18 13 9.70	
18	170	87 23 35.0	22 57.7	143.18	0.73	.0070411	11.7	18 9 13.79	
19	171	88 20 51.0	20 13.5	143.16	0.61	.0070680	10.7	18 5 17.88	
20	172	89 18 6.6	17 29.0	143.14	0.48	.0070924	9.6	18 1 21.97	
21	173	90 15 21.7	14 43.9	143.11	0.35	.0071143	8.5	17 57 26.06	
22	174	91 12 36.3	11 58.3	143.09	0.21	.0071336	7.5	17 53 30.14	
23	175	92 9 50.3	9 12.1	143.07	+0.08	.0071503	6.5	17 49 34.23	
24	176	93 7 3.8	6 25.4	143.05	—0.05	.0071647	5.5	17 45 38.32	
25	177	94 4 16.8	3 38.3	143.03	0.15	.0071769	4.6	17 41 42.41	
26	178	95 1 29.4	0 50.7	143.01	0.21	.0071869	3.7	17 37 46.50	
27	179	95 58 41.5	58 2.6	142.99	0.26	.0071949	2.9	17 33 50.58	
28	180	96 55 53.1	55 14.0	142.97	0.27	.0072010	2.2	17 29 54.67	
29	181	97 53 4.4	52 25.1	142.96	0.26	.0072053	1.5	17 25 58.76	
30	182	98 50 15.4	49 35.9	142.95	0.21	.0072080	0.8	17 22 2.85	
31	183	99 47 26.2	46 46.5	142.94	—0.14	0.0072091	0.1	17 18 6.94	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.



## GREENWICH MEAN TIME.

## THE MOON'S

THE MOON'S									
Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.	h. m.	Diff. for 1 hour.	
1	16 2.2	15 58.9	58 44.8	-0.95	58 32.5	-1.10	10 17.5	2.34	11.7
2	15 55.1	15 50.8	58 18.5	1.23	58 3.0	1.35	11 14.8	2.42	12.7
3	15 46.2	15 41.4	57 46.1	1.45	57 28.2	1.53	12 13.2	2.43	13.7
4	15 36.2	15 31.0	57 9.4	1.59	56 50.1	1.62	13 10.6	2.35	14.7
5	15 25.7	15 20.5	56 30.7	1.61	56 11.5	1.58	14 5.3	2.21	15.7
6	15 15.4	15 10.5	55 52.8	1.52	55 35.0	1.44	14 56.3	2.04	16.7
7	15 6.0	15 1.9	55 18.3	1.33	55 3.2	1.20	15 43.3	1.89	17.7
8	14 58.2	14 55.1	54 49.7	1.04	54 38.3	0.86	16 26.9	1.76	18.7
9	14 52.6	14 50.7	54 29.0	0.67	54 22.1	0.48	17 8.1	1.68	19.7
10	14 49.4	14 48.9	54 17.5	-0.27	54 15.5	-0.06	17 47.9	1.65	20.7
11	14 49.1	14 49.9	54 16.1	+0.16	54 19.3	+0.37	18 27.5	1.66	21.7
12	14 51.5	14 53.7	54 25.0	0.58	54 33.2	0.78	19 8.0	1.72	22.7
13	14 56.6	15 0.1	54 43.8	0.98	54 56.7	1.16	19 50.6	1.83	23.7
14	15 4.2	15 8.7	55 11.6	1.32	55 28.4	1.47	20 36.3	1.98	24.7
15	15 13.8	15 19.1	55 46.8	1.59	56 6.5	1.68	21 25.9	2.16	25.7
16	15 24.7	15 30.4	56 27.0	1.74	56 48.1	1.77	22 19.9	2.33	26.7
17	15 36.2	15 42.0	57 9.4	1.77	57 30.5	1.73	23 17.6	2.46	27.7
18	15 47.5	15 52.8	57 50.8	1.65	58 10.1	1.56	6		28.7
19	15 57.7	16 2.1	58 28.1	1.43	58 44.2	1.27	0 17.3	2.51	0.3
20	16 5.9	16 9.2	58 58.4	1.09	59 10.4	0.90	1 16.9	2.45	1.3
21	16 11.8	16 13.8	59 20.1	0.71	59 27.5	0.51	2 14.3	2.33	2.3
22	16 15.2	16 15.9	59 32.4	+0.32	59 35.1	+0.14	3 8.7	2.20	3.3
23	16 16.1	16 15.7	59 35.7	-0.04	59 34.2	-0.20	4 0.2	2.10	4.3
24	16 14.8	16 13.4	59 30.9	0.31	59 26.1	0.47	4 49.7	2.03	5.3
25	16 11.7	16 9.7	59 19.7	0.58	59 12.2	0.68	5 38.3	2.02	6.3
26	16 7.3	16 4.7	59 3.5	0.76	58 53.9	0.83	6 27.3	2.07	7.3
27	16 1.8	15 58.8	58 43.5	0.90	58 32.2	0.97	7 17.8	2.15	8.3
28	15 55.5	15 52.1	58 20.3	1.02	58 7.8	1.07	8 10.7	2.25	9.3
29	15 48.5	15 44.8	57 54.6	1.12	57 40.8	1.17	9 6.2	2.35	10.3
30	15 40.9	15 36.9	57 26.6	1.20	57 11.9	1.24	10 3.0	2.39	11.3
31	15 32.8	15 28.6	56 56.8	-1.27	56 41.4	-1.29	11 0.1	2.35	12.3



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 1.					SUNDAY 3.				
	h. m. s.	"	S. O. I. "	"		h. m. s.	"	S. O. I. "	"
0	14 35 15.25	2.3781	S. 20 30 29.3	10.406	0	16 33 13.99	2.5045	S. 26 3 55.1	3.176
1	14 37 38.06	2.3823	20 40 49.8	10.377	1	16 35 44.26	2.5046	26 7 0.7	3.011
2	14 40 1.13	2.3865	20 51 2.6	10.149	2	16 38 14.54	2.5046	26 9 56.4	2.846
3	14 42 24.45	2.3907	21 1 7.5	10.019	3	16 40 44.81	2.5044	26 12 42.2	2.680
4	14 44 48.02	2.3948	21 11 4.7	9.888	4	16 43 15.07	2.5041	26 15 18.0	2.514
5	14 47 11.84	2.3990	21 20 54.1	9.755	5	16 45 45.31	2.5037	26 17 43.9	2.349
6	14 49 35.90	2.4030	21 30 35.5	9.621	6	16 48 15.52	2.5032	26 19 59.9	2.184
7	14 52 0.20	2.4070	21 40 8.8	9.487	7	16 50 45.70	2.5028	26 22 6.0	2.019
8	14 54 24.74	2.4110	21 49 33.9	9.351	8	16 53 15.83	2.5018	26 24 2.2	1.853
9	14 56 49.52	2.4150	21 58 50.8	9.213	9	16 55 45.91	2.5008	26 25 48.4	1.688
10	14 59 14.54	2.4189	22 7 59.4	9.074	10	16 58 15.93	2.4997	26 27 24.8	1.523
11	15 1 39.79	2.4227	22 16 59.7	8.934	11	17 0 45.98	2.4986	26 28 51.3	1.359
12	15 4 5.26	2.4264	22 25 51.5	8.793	12	17 3 15.76	2.4973	26 30 7.9	1.194
13	15 6 30.96	2.4301	22 34 34.9	8.652	13	17 5 45.56	2.4959	26 31 14.6	1.030
14	15 8 56.87	2.4337	22 43 9.7	8.510	14	17 8 15.26	2.4943	26 32 11.5	0.865
15	15 11 23.00	2.4373	22 51 36.0	8.368	15	17 10 44.86	2.4926	26 32 58.6	0.702
16	15 13 49.35	2.4408	22 59 53.6	8.221	16	17 13 14.36	2.4907	26 33 35.8	0.539
17	15 16 15.91	2.4443	23 8 2.5	8.075	17	17 15 43.75	2.4887	26 34 3.2	0.376
18	15 18 42.67	2.4476	23 16 2.6	7.928	18	17 18 13.01	2.4866	26 34 20.9	0.213
19	15 21 9.63	2.4509	23 23 53.9	7.780	19	17 20 42.14	2.4844	26 34 28.8	0.051
20	15 23 36.78	2.4541	23 31 36.3	7.631	20	17 23 11.14	2.4821	26 34 27.0	0.111
21	15 26 4.13	2.4573	23 39 9.6	7.481	21	17 25 39.99	2.4796	26 34 15.5	0.372
22	15 28 31.66	2.4604	23 46 33.9	7.330	22	17 28 8.69	2.4770	26 33 54.4	0.132
23	15 30 59.38	2.4634	S. 23 53 49.2	7.179	23	17 30 37.93	2.4743	S. 26 33 23.7	0.592
SATURDAY 2.					MONDAY 4.				
	h. m. s.	"	S. 24 0 55.4	7.026	0	17 33 5.61	2.4715	S. 26 32 43.3	0.733
1	15 35 55.33	2.4661	24 7 52.4	6.873	1	17 35 33.81	2.4685	26 31 53.4	0.512
2	15 38 23.56	2.4718	24 14 40.1	6.717	2	17 38 1.83	2.4654	26 30 53.9	1.070
3	15 40 51.95	2.4744	24 21 18.5	6.562	3	17 40 29.66	2.4622	26 29 44.9	1.226
4	15 43 20.49	2.4780	24 27 47.6	6.407	4	17 42 57.30	2.4588	26 28 26.5	1.385
5	15 45 49.18	2.4798	24 34 7.4	6.251	5	17 45 24.73	2.4554	26 26 58.6	1.542
6	15 48 18.01	2.4816	24 40 17.7	6.094	6	17 47 51.95	2.4519	26 25 21.4	1.698
7	15 50 46.98	2.4830	24 46 18.6	5.936	7	17 50 18.96	2.4483	26 23 34.9	1.853
8	15 53 16.08	2.4861	24 52 10.0	5.777	8	17 52 45.75	2.4446	26 21 39.1	2.007
9	15 55 45.31	2.4881	24 57 51.8	5.617	9	17 55 12.31	2.4407	26 19 34.0	2.161
10	15 58 14.65	2.4900	25 3 24.1	5.457	10	17 57 38.64	2.4367	26 17 19.8	2.314
11	16 0 44.11	2.4918	25 8 46.8	5.297	11	18 0 4.72	2.4327	26 14 56.4	2.466
12	16 3 13.07	2.4935	25 13 59.8	5.136	12	18 2 30.56	2.4285	26 12 23.9	2.617
13	16 5 43.33	2.4951	25 19 3.1	4.975	13	18 4 56.14	2.4243	26 9 42.3	2.767
14	16 8 13.08	2.4965	25 23 56.8	4.814	14	18 7 21.46	2.4198	26 6 51.8	2.916
15	16 10 42.91	2.4978	25 28 40.8	4.652	15	18 9 46.52	2.4154	26 3 52.3	3.065
16	16 13 12.89	2.4990	25 33 15.0	4.489	16	18 12 11.31	2.4108	26 0 44.0	3.212
17	16 15 42.80	2.5009	25 37 39.4	4.325	17	18 14 35.82	2.4062	25 57 26.8	3.359
18	16 18 12.84	2.5013	25 41 54.0	4.162	18	18 17 0.05	2.4014	25 54 0.9	3.504
19	16 20 42.94	2.5020	25 45 58.8	3.998	19	18 19 23.99	2.3966	25 50 26.3	3.649
20	16 23 13.08	2.5027	25 49 53.8	3.834	20	18 21 47.64	2.3917	25 46 43.0	3.793
21	16 25 43.26	2.5033	25 53 38.9	3.670	21	18 24 10.99	2.3867	25 42 51.1	3.938
22	16 28 13.48	2.5038	25 57 14.2	3.506	22	18 26 34.04	2.3816	25 38 50.7	4.077
23	16 30 43.73	2.5043	26 0 39.6	3.341	23	18 28 56.79	2.3765	25 34 41.8	4.218
24	16 33 13.99	2.5045	S. 26 3 55.1	3.176	24	18 31 19.92	2.3713	S. 25 30 24.6	4.357



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 5.					THURSDAY 7.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	18 31 19.22	2.3713	S.25 30 24.6	4.357	0	20 18 17.66	2.0602	S.19 42 44.1	9.664
1	18 33 41.34	2.3680	25 25 59.0	4.406	1	20 20 22.20	2.0742	19 33 1.8	9.745
2	18 36 3.14	2.3606	25 21 25.1	4.463	2	20 22 26.56	2.0662	19 23 14.7	9.825
3	18 38 24.61	2.3562	25 16 43.0	4.769	3	20 24 30.47	2.0622	19 13 22.8	9.904
4	18 40 45.76	2.3497	25 11 52.8	4.904	4	20 26 34.03	2.0563	19 3 26.2	9.982
5	18 43 6.57	2.3441	25 6 54.5	5.088	5	20 28 37.23	2.0504	18 53 25.0	10.068
6	18 45 27.05	2.3386	25 1 48.9	5.170	6	20 30 40.08	2.0446	18 43 19.2	10.133
7	18 47 47.19	2.3338	24 56 34.0	5.302	7	20 32 42.58	2.0388	18 33 9.0	10.207
8	18 50 6.99	2.3271	24 51 11.9	5.433	8	20 34 44.74	2.0331	18 22 54.3	10.280
9	18 52 26.44	2.3213	24 45 42.0	5.563	9	20 36 46.56	2.0274	18 12 35.3	10.342
10	18 54 45.55	2.3155	24 40 4.3	5.691	10	20 38 48.03	2.0217	18 2 12.0	10.423
11	18 57 4.30	2.3096	24 34 19.0	5.818	11	20 40 49.16	2.0161	17 51 44.4	10.494
12	18 59 22.70	2.3037	24 28 26.1	5.944	12	20 42 49.96	2.0106	17 41 12.7	10.563
13	19 1 40.74	2.2977	24 22 25.7	6.069	13	20 44 50.43	2.0050	17 30 36.9	10.630
14	19 3 58.42	2.2917	24 16 17.8	6.193	14	20 46 50.56	1.9995	17 19 57.1	10.696
15	19 6 15.74	2.2857	24 10 2.6	6.314	15	20 48 50.36	1.9940	17 9 13.3	10.762
16	19 8 32.70	2.2796	24 3 40.1	6.435	16	20 50 49.84	1.9886	16 58 25.6	10.827
17	19 10 49.29	2.2735	23 57 10.4	6.556	17	20 52 48.99	1.9832	16 47 34.0	10.891
18	19 13 5.52	2.2674	23 50 33.5	6.674	18	20 54 47.83	1.9779	16 36 38.7	10.954
19	19 15 21.38	2.2612	23 43 49.5	6.792	19	20 56 46.35	1.9727	16 25 39.6	11.016
20	19 17 36.86	2.2550	23 36 58.5	6.908	20	20 58 44.56	1.9675	16 14 36.9	11.076
21	19 19 51.97	2.2488	23 30 0.5	7.023	21	21 0 42.46	1.9624	16 3 30.6	11.135
22	19 22 6.71	2.2426	23 22 55.7	7.136	22	21 2 40.05	1.9573	15 52 20.7	11.194
23	19 24 21.08	2.2363	S.23 15 44.1	7.249	23	21 4 37.34	1.9523	S.15 41 7.3	11.252
WEDNESDAY 6.					FRIDAY 8.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	19 26 35.07	2.2301	S.23 8 25.8	7.361	0	21 6 34.33	1.9474	S.15 29 50.5	11.306
1	19 28 48.68	2.2238	23 1 0.8	7.471	1	21 8 31.03	1.9426	15 18 30.4	11.363
2	19 31 1.92	2.2175	22 53 29.3	7.580	2	21 10 27.43	1.9376	15 7 6.9	11.418
3	19 33 14.78	2.2112	22 45 51.3	7.687	3	21 12 23.54	1.9326	14 55 40.2	11.472
4	19 35 27.26	2.2049	22 38 6.8	7.793	4	21 14 19.37	1.9281	14 44 10.3	11.524
5	19 37 39.36	2.1985	22 30 16.0	7.898	5	21 16 14.91	1.9234	14 32 37.3	11.576
6	19 39 51.08	2.1921	22 22 19.0	8.002	6	21 18 10.18	1.9186	14 21 1.2	11.627
7	19 42 2.42	2.1856	22 14 15.8	8.104	7	21 20 5.18	1.9143	14 9 22.0	11.677
8	19 44 13.38	2.1795	22 6 6.5	8.205	8	21 21 59.90	1.9098	13 57 39.9	11.726
9	19 46 23.96	2.1732	21 57 51.1	8.306	9	21 23 54.36	1.9054	13 45 54.9	11.774
10	19 48 34.17	2.1669	21 49 29.8	8.405	10	21 25 48.55	1.9010	13 34 7.0	11.821
11	19 50 43.99	2.1606	21 41 2.5	8.503	11	21 27 42.48	1.8967	13 22 16.3	11.867
12	19 52 53.44	2.1543	21 32 29.4	8.600	12	21 29 36.15	1.8923	13 10 22.9	11.912
13	19 55 2.51	2.1480	21 23 50.5	8.695	13	21 31 29.57	1.8883	12 58 26.8	11.957
14	19 57 11.20	2.1417	21 15 6.0	8.789	14	21 33 22.74	1.8843	12 46 28.0	12.001
15	19 59 19.52	2.1355	21 6 15.9	8.892	15	21 35 15.67	1.8803	12 34 26.6	12.045
16	20 1 27.46	2.1292	20 57 20.2	8.974	16	21 37 8.36	1.8763	12 22 22.6	12.087
17	20 3 35.03	2.1231	20 48 19.0	9.064	17	21 39 0.81	1.8723	12 10 16.1	12.128
18	20 5 42.23	2.1169	20 39 12.5	9.153	18	21 40 53.03	1.8684	11 58 7.2	12.168
19	20 7 49.05	2.1107	20 30 0.7	9.241	19	21 42 45.02	1.8644	11 45 55.9	12.207
20	20 9 55.51	2.1045	20 20 43.6	9.328	20	21 44 36.78	1.8606	11 33 42.3	12.246
21	20 12 1.60	2.0984	20 11 21.3	9.414	21	21 46 28.32	1.8573	11 21 26.4	12.284
22	20 14 7.32	2.0923	20 1 53.9	9.499	22	21 48 19.65	1.8537	11 9 8.2	12.321
23	20 16 12.67	2.0862	19 52 21.5	9.582	23	21 50 10.76	1.8502	10 56 47.9	12.357
24	20 18 17.66	2.0802	S.19 42 44.1	9.664	24	21 52 1.67	1.8467	S.10 44 25.4	12.392



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 9.					MONDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	21 52 1.67	1.8467	S. 10 44 25.4	13.892	0	23 18 3.31	1.7657	S. 0 23 26.6	13.365
1	21 53 52.37	1.8433	10 32 0.8	13.427	1	23 19 49.26	1.7666	S. 0 9 10.7	13.367
2	21 55 42.87	1.8400	10 19 34.9	12.461	2	23 21 35.91	1.7660	N. 0 4 5.4	13.369
3	21 57 33.17	1.8367	10 7 5.5	12.494	3	23 23 21.18	1.7663	0 17 21.6	13.370
4	21 59 23.28	1.8336	9 54 34.9	12.526	4	23 25 7.17	1.7666	0 30 37.8	13.370
5	22 1 13.20	1.8305	9 42 2.3	12.558	5	23 26 53.18	1.7670	0 43 54.0	13.370
6	22 3 2.94	1.8275	9 29 27.9	12.589	6	23 28 39.21	1.7675	0 57 10.9	13.369
7	22 4 52.50	1.8246	9 16 51.6	12.620	7	23 30 25.28	1.7681	1 10 26.4	13.368
8	22 6 41.89	1.8217	9 4 13.5	12.649	8	23 32 11.38	1.7687	1 23 42.4	13.366
9	22 8 31.10	1.8188	8 51 33.7	12.677	9	23 33 57.52	1.7694	1 36 58.3	13.363
10	22 10 20.15	1.8161	8 38 52.2	12.705	10	23 35 43.71	1.7702	1 50 14.0	13.359
11	22 12 9.04	1.8135	8 26 9.1	12.732	11	23 37 29.94	1.7710	2 3 29.4	13.355
12	22 13 57.77	1.8109	8 13 24.3	12.759	12	23 39 16.23	1.7720	2 16 44.6	13.351
13	22 15 46.34	1.8083	8 0 38.0	12.785	13	23 41 2.58	1.7730	2 29 59.5	13.346
14	22 17 34.77	1.8059	7 47 50.1	12.810	14	23 42 48.99	1.7741	2 43 14.1	13.340
15	22 19 23.05	1.8035	7 35 0.8	12.834	15	23 44 35.47	1.7752	2 56 28.3	13.333
16	22 21 11.19	1.8012	7 22 10.0	12.858	16	23 46 22.02	1.7763	3 9 42.0	13.325
17	22 22 59.19	1.7989	7 9 17.8	12.881	17	23 48 8.64	1.7778	3 22 55.3	13.317
18	22 24 47.06	1.7967	6 56 24.3	12.903	18	23 49 55.35	1.7792	3 36 8.1	13.308
19	22 26 34.80	1.7946	6 43 29.5	12.924	19	23 51 42.15	1.7807	3 49 20.3	13.299
20	22 28 22.41	1.7926	6 30 33.4	12.945	20	23 53 29.03	1.7822	4 2 32.0	13.289
21	22 30 9.91	1.7907	6 17 36.0	12.966	21	23 55 16.01	1.7838	4 15 43.1	13.279
22	22 31 57.29	1.7888	6 4 37.5	12.986	22	23 57 3.08	1.7855	4 28 53.5	13.268
23	22 33 44.56	1.7870	S. 5 51 37.8	13.004	23	23 58 50.26	1.7872	N. 4 42 3.3	13.257
SUNDAY 10.					TUESDAY 12.				
0	22 35 31.73	1.7863	S. 5 38 37.0	13.023	0	0 0 37.55	1.7890	N. 4 55 12.3	13.244
1	22 37 18.79	1.7856	5 25 35.9	13.039	1	0 2 24.95	1.7909	5 8 20.6	13.231
2	22 39 5.76	1.7830	5 12 32.3	13.056	2	0 4 12.46	1.7929	5 21 28.0	13.217
3	22 40 52.63	1.7805	4 59 28.4	13.072	3	0 6 0.10	1.7950	5 34 34.5	13.203
4	22 42 39.42	1.7791	4 46 23.6	13.087	4	0 7 47.86	1.7972	5 47 40.2	13.087
5	22 44 26.12	1.7777	4 33 17.9	13.103	5	0 9 35.76	1.7994	6 0 44.9	13.071
6	22 46 12.74	1.7764	4 20 11.3	13.117	6	0 11 23.79	1.8017	6 13 48.7	13.054
7	22 47 59.29	1.7752	4 7 3.8	13.131	7	0 13 11.96	1.8040	6 26 51.4	13.037
8	22 49 45.76	1.7740	3 53 55.6	13.144	8	0 15 0.27	1.8064	6 39 53.1	13.019
9	22 51 32.17	1.7729	3 40 46.6	13.156	9	0 16 48.73	1.8089	6 52 53.7	13.000
10	22 53 18.51	1.7719	3 27 36.9	13.167	10	0 18 37.34	1.8115	7 5 53.1	12.980
11	22 55 4.80	1.7710	3 14 28.5	13.178	11	0 20 26.11	1.8142	7 18 51.3	12.960
12	22 56 51.03	1.7702	3 1 15.5	13.189	12	0 22 15.04	1.8169	7 31 48.3	12.939
13	22 58 37.22	1.7694	2 48 3.9	13.198	13	0 24 4.14	1.8197	7 44 44.0	12.917
14	23 0 23.36	1.7687	2 34 51.7	13.208	14	0 25 53.41	1.8226	7 57 38.4	12.896
15	23 2 9.46	1.7681	2 21 38.9	13.217	15	0 27 42.85	1.8255	8 10 31.4	12.873
16	23 3 55.53	1.7675	2 8 25.7	13.225	16	0 29 32.47	1.8285	8 23 23.0	12.848
17	23 5 41.56	1.7670	1 55 12.0	13.232	17	0 31 22.97	1.8316	8 36 13.1	12.823
18	23 7 27.57	1.7666	1 41 57.9	13.238	18	0 33 12.26	1.8348	8 49 1.7	12.797
19	23 9 13.56	1.7663	1 28 43.4	13.244	19	0 35 2.44	1.8380	9 1 48.7	12.771
20	23 10 59.53	1.7660	1 15 28.6	13.249	20	0 36 52.82	1.8413	9 14 34.2	12.744
21	23 12 45.48	1.7658	1 2 13.5	13.254	21	0 38 43.40	1.8447	9 27 18.0	12.716
22	23 14 31.43	1.7657	0 48 58.1	13.258	22	0 40 34.19	1.8482	9 40 0.1	12.687
23	23 16 17.37	1.7657	0 35 42.4	13.263	23	0 42 25.18	1.8517	9 52 40.5	12.656
24	23 18 3.31	1.7657	S. 0 22 26.6	13.268	24	0 44 16.39	1.8553	N. 10 5 19.1	12.625



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 13.					FRIDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	0 44 16.39	1.8653	N.10 5 19.1	12.623	0	2 18 46.02	2.1051	N.19 19 3.1	10.047
1	0 46 7.82	1.8690	10 17 55.8	12.597	1	2 20 52.52	2.1117	19 29 3.5	9.966
2	0 47 59.47	1.8698	10 30 30.7	12.565	2	2 22 59.42	2.1182	19 38 59.0	9.884
3	0 49 51.35	1.8666	10 43 3.6	12.533	3	2 25 6.71	2.1247	19 48 49.5	9.800
4	0 51 43.46	1.8705	10 55 34.5	12.498	4	2 27 14.39	2.1313	19 58 35.0	9.716
5	0 53 35.81	1.8745	11 8 3.3	12.463	5	2 29 22.47	2.1379	20 8 15.4	9.630
6	0 55 28.40	1.8785	11 20 30.1	12.428	6	2 31 30.94	2.1445	20 17 50.6	9.542
7	0 57 21.23	1.8826	11 32 54.7	12.392	7	2 33 39.81	2.1512	20 27 20.5	9.453
8	0 59 14.31	1.8868	11 45 17.1	12.355	8	2 35 49.08	2.1579	20 36 45.0	9.363
9	1 1 7.64	1.8910	11 57 37.3	12.317	9	2 37 58.76	2.1647	20 46 4.1	9.272
10	1 3 1.93	1.8953	12 9 55.2	12.278	10	2 40 8.84	2.1714	20 55 17.7	9.179
11	1 4 55.06	1.8997	12 22 10.7	12.238	11	2 42 19.32	2.1782	21 4 25.6	9.086
12	1 6 49.19	1.9042	12 34 23.8	12.199	12	2 44 30.21	2.1849	21 13 27.9	8.990
13	1 8 43.57	1.9087	12 46 34.5	12.157	13	2 46 41.51	2.1917	21 22 24.4	8.893
14	1 10 38.23	1.9133	12 58 42.6	12.114	14	2 48 53.22	2.1985	21 31 15.1	8.795
15	1 12 33.16	1.9179	13 10 48.1	12.070	15	2 51 5.34	2.2054	21 39 59.9	8.696
16	1 14 28.38	1.9225	13 22 51.0	12.025	16	2 53 17.87	2.2122	21 48 38.6	8.595
17	1 16 23.88	1.9274	13 34 51.2	11.980	17	2 55 30.81	2.2191	21 57 11.2	8.493
18	1 18 19.67	1.9323	13 46 48.6	11.934	18	2 57 44.16	2.2260	22 5 37.7	8.390
19	1 20 15.76	1.9372	13 58 43.2	11.887	19	2 59 57.92	2.2328	22 13 58.0	8.285
20	1 22 12.14	1.9422	14 10 35.0	11.839	20	3 2 12.10	2.2397	22 22 11.9	8.179
21	1 24 8.82	1.9472	14 22 23.8	11.789	21	3 4 26.69	2.2465	22 30 19.4	8.072
22	1 26 5.81	1.9523	14 34 9.7	11.739	22	3 6 41.68	2.2533	22 38 20.5	7.963
23	1 28 3.10	1.9575	N.14 45 52.6	11.688	23	3 8 57.08	2.2601	N.22 46 15.0	7.853
THURSDAY 14.					SATURDAY 16.				
0	1 30 0.71	1.9626	N.14 57 32.3	11.636	0	3 11 12.89	2.2670	N.22 54 2.8	7.740
1	1 31 58.64	1.9681	15 9 8.9	11.582	1	3 13 29.12	2.2738	23 1 43.9	7.628
2	1 33 56.88	1.9734	15 20 42.2	11.527	2	3 15 45.75	2.2806	23 9 18.2	7.514
3	1 35 55.45	1.9788	15 32 12.2	11.473	3	3 18 2.79	2.2873	23 16 45.6	7.398
4	1 37 54.34	1.9843	15 43 38.8	11.418	4	3 20 20.23	2.2941	23 24 6.0	7.281
5	1 39 53.57	1.9899	15 55 2.0	11.357	5	3 22 38.08	2.3008	23 31 19.3	7.162
6	1 41 53.13	1.9956	16 6 21.7	11.296	6	3 24 56.33	2.3075	23 38 25.5	7.043
7	1 43 53.03	2.0012	16 17 37.9	11.233	7	3 27 14.98	2.3142	23 45 24.5	6.922
8	1 45 53.27	2.0069	16 28 50.4	11.170	8	3 29 34.03	2.3209	23 52 16.1	6.799
9	1 47 53.85	2.0126	16 39 50.3	11.117	9	3 31 53.48	2.3275	23 59 0.3	6.676
10	1 49 54.78	2.0184	16 51 4.4	11.064	10	3 34 13.33	2.3341	24 5 37.1	6.550
11	1 51 56.06	2.0242	17 2 5.7	10.999	11	3 36 33.57	2.3406	24 12 6.3	6.422
12	1 53 57.70	2.0302	17 13 3.1	10.923	12	3 38 54.30	2.3471	24 18 27.9	6.296
13	1 55 59.69	2.0362	17 23 56.6	10.867	13	3 41 15.22	2.3536	24 24 41.8	6.167
14	1 58 2.04	2.0422	17 34 46.0	10.790	14	3 43 36.63	2.3600	24 30 47.9	6.036
15	2 0 4.76	2.0483	17 45 31.3	10.721	15	3 45 58.42	2.3663	24 36 46.1	5.904
16	2 2 7.84	2.0545	17 56 12.5	10.650	16	3 48 20.59	2.3726	24 42 36.4	5.771
17	2 4 11.29	2.0607	18 6 49.4	10.579	17	3 50 43.14	2.3789	24 48 18.7	5.637
18	2 6 15.12	2.0669	18 17 22.0	10.507	18	3 53 6.06	2.3851	24 53 52.8	5.501
19	2 8 19.32	2.0731	18 27 50.2	10.433	19	3 55 29.35	2.3912	24 59 18.7	5.363
20	2 10 23.80	2.0794	18 38 14.0	10.358	20	3 57 53.01	2.3973	25 4 36.4	5.225
21	2 12 28.85	2.0856	18 48 33.2	10.282	21	4 0 17.03	2.4033	25 9 45.8	5.087
22	2 14 34.19	2.0922	18 58 47.9	10.205	22	4 2 41.41	2.4092	25 14 46.8	4.946
23	2 16 39.91	2.0986	19 8 57.9	10.127	23	4 5 6.14	2.4151	25 19 39.3	4.803
24	2 18 46.02	2.1051	N.19 19 3.1	10.047	24	4 7 31.22	2.4209	N.25 24 23.2	4.660



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 17.					TUESDAY 19.				
0	h. m. s.	s.	N. 25 24 23.2	4.669	0	h. m. s.	s.	N. 26 4 54.3	3.211
1	4 7 31.92	2.4209	25 28 58.5	4.516	1	6 8 22.41	2.6632	26 1 36.4	2.394
2	4 9 56.65	2.4267	25 33 25.1	4.370	2	6 10 56.31	2.6648	25 58 8.2	3.587
3	4 12 22.42	2.4323	25 37 42.9	4.228	3	6 13 30.18	2.6643	25 54 29.6	3.729
4	4 14 48.52	2.4378	25 41 51.9	4.078	4	6 16 4.02	2.6687	25 50 40.7	3.901
5	4 17 14.95	2.4432	25 45 51.9	3.928	5	6 18 37.82	2.6629	25 46 41.4	4.078
6	4 19 41.71	2.4486	25 49 43.0	3.776	6	6 21 11.56	2.6619	25 42 31.9	4.245
7	4 22 8.78	2.4538	25 53 25.1	3.628	7	6 23 45.25	2.6609	25 38 19.1	4.416
8	4 24 36.17	2.4590	25 56 58.0	3.472	8	6 26 18.87	2.6597	25 33 42.0	4.586
9	4 27 3.96	2.4641	26 0 21.7	3.318	9	6 28 52.42	2.6584	25 29 1.7	4.756
10	4 29 31.86	2.4692	26 3 36.2	3.164	10	6 31 25.88	2.6569	25 24 11.3	4.926
11	4 32 0.16	2.4741	26 6 41.4	3.009	11	6 33 59.25	2.6554	25 19 10.7	5.095
12	4 34 28.74	2.4788	26 9 37.3	2.852	12	6 36 32.52	2.6537	25 13 59.9	5.264
13	4 36 57.01	2.4834	26 12 23.7	2.698	13	6 39 5.69	2.6519	25 8 39.0	5.433
14	4 39 26.75	2.4880	26 15 0.7	2.536	14	6 41 38.74	2.6498	25 3 8.1	5.599
15	4 41 56.17	2.4924	26 17 28.1	2.377	15	6 44 11.66	2.6477	24 57 27.2	5.763
16	4 44 25.85	2.4968	26 19 45.9	2.217	16	6 46 44.46	2.6456	24 51 36.3	5.931
17	4 46 55.79	2.5011	26 21 54.1	2.056	17	6 49 17.12	2.6432	24 45 35.4	6.097
18	4 49 25.98	2.5052	26 23 52.6	1.894	18	6 51 49.64	2.6407	24 39 24.7	6.261
19	4 51 56.41	2.5091	26 25 41.3	1.731	19	6 54 22.00	2.6381	24 33 4.2	6.424
20	4 54 27.07	2.5129	26 27 20.3	1.567	20	6 56 54.21	2.6344	24 26 33.8	6.587
21	4 56 57.96	2.5166	26 28 49.4	1.402	21	6 59 26.25	2.6326	24 19 53.6	6.750
22	4 59 29.07	2.5203	26 30 8.6	1.237	22	7 1 58.12	2.6307	24 13 3.8	6.911
23	5 2 0.40	2.5238	N. 26 31 17.9	1.072	23	7 4 29.82	2.6287	N. 24 6 4.4	7.071
24	5 4 31.93	2.5271				7 7 1.33	2.6266		
MONDAY 18.					WEDNESDAY 20.				
0	h. m. s.	s.	N. 26 32 17.3	0.906	0	h. m. s.	s.	N. 23 58 55.3	7.230
1	5 7 3.65	2.5303	26 33 6.6	0.738	1	7 9 32.65	2.6204	23 51 36.7	7.398
2	5 9 35.56	2.5334	26 33 45.9	0.570	2	7 12 3.78	2.6171	23 44 8.7	7.565
3	5 12 7.66	2.5364	26 34 15.1	0.402	3	7 14 34.70	2.6127	23 36 31.2	7.702
4	5 14 39.93	2.5392	26 34 34.1	0.233	4	7 17 5.42	2.6103	23 28 44.4	7.857
5	5 17 12.36	2.5419	26 34 43.0	0.063	5	7 19 35.92	2.6068	23 20 48.3	8.012
6	5 19 44.95	2.5444	26 34 41.7	0.107	6	7 22 6.20	2.6028	23 12 42.9	8.166
7	5 22 17.69	2.5468	26 34 30.2	0.377	7	7 24 36.26	2.6001	23 4 28.4	8.317
8	5 24 50.57	2.5491	26 34 8.5	0.448	8	7 27 6.10	2.5963	22 47 32.3	8.467
9	5 27 23.58	2.5512	26 33 36.5	0.619	9	7 29 35.70	2.5914	22 38 50.8	8.617
10	5 29 56.71	2.5532	26 32 54.2	0.791	10	7 32 5.07	2.5874	22 30 0.4	8.765
11	5 32 29.96	2.5550	26 32 1.6	0.963	11	7 34 34.19	2.5833	22 21 1.3	8.912
12	5 35 3.31	2.5566	26 30 58.6	1.135	12	7 37 3.07	2.5792	22 11 53.4	9.059
13	5 37 36.75	2.5582	26 29 45.3	1.307	13	7 39 31.70	2.5750	22 2 36.8	9.204
14	5 40 10.29	2.5596	26 28 21.7	1.480	14	7 42 0.07	2.5707	21 53 11.7	9.347
15	5 42 43.90	2.5608	26 26 47.7	1.653	15	7 44 28.19	2.5664	21 43 38.1	9.489
16	5 45 17.58	2.5618	26 25 3.3	1.826	16	7 46 56.04	2.5620	21 33 56.1	9.630
17	5 47 51.32	2.5626	26 23 8.5	1.999	17	7 49 23.63	2.5576	21 24 5.8	9.769
18	5 50 25.11	2.5633	26 21 3.4	2.172	18	7 51 50.95	2.5531	21 14 7.9	9.907
19	5 53 58.95	2.5642	26 18 47.9	2.345	19	7 54 18.00	2.5486	20 53 45.6	10.044
20	5 56 32.82	2.5647	26 16 22.0	2.519	20	7 56 44.78	2.5440	20 43 29.8	10.180
21	5 58 6.72	2.5651	26 13 45.6	2.692	21	7 59 11.28	2.5394	20 32 52.1	10.314
22	6 0 40.64	2.5653	26 10 58.9	2.865	22	8 1 37.50	2.5347	20 22 13.5	10.446
23	6 3 14.56	2.5654	26 8 1.8	3.038	23	8 4 3.44	2.5300		10.577
24	6 5 48.49	2.5654	N. 26 4 54.3	3.211	24	8 6 29.10	2.5252		
	6 8 22.41	2.5652				8 8 54.47	2.5204		



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 21.					SATURDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	8 8 54.47	2.4304	N. 20 99 13.5	10.707	0	9 59 36.21	2.2025	N. 9 48 34.5	15.074
1	8 11 19.55	2.4186	20 11 27.2	10.838	1	10 1 48.25	2.1990	9 33 28.5	15.126
2	8 13 44.34	2.4108	20 0 33.3	10.962	2	10 4 0.09	2.1956	9 18 19.4	15.178
3	8 16 8.85	2.4060	19 49 31.8	11.087	3	10 6 11.79	2.1922	9 3 7.4	15.228
4	8 18 33.06	2.4011	19 38 23.8	11.211	4	10 8 23.16	2.1889	8 47 52.6	15.270
5	8 20 56.98	2.3962	19 27 6.4	11.334	5	10 10 34.40	2.1857	8 32 35.0	15.315
6	8 23 20.61	2.3913	19 15 42.7	11.454	6	10 12 45.44	2.1825	8 17 14.8	15.366
7	8 25 43.94	2.3864	19 4 11.8	11.573	7	10 14 56.30	2.1794	8 1 52.0	15.400
8	8 28 6.98	2.3816	18 52 33.9	11.691	8	10 17 6.97	2.1764	7 46 26.8	15.440
9	8 30 29.72	2.3765	18 40 48.9	11.807	9	10 19 17.47	2.1735	7 30 59.2	15.479
10	8 32 52.16	2.3716	18 28 57.0	11.921	10	10 21 27.70	2.1706	7 15 29.3	15.516
11	8 35 14.31	2.3667	18 16 58.3	12.034	11	10 23 37.94	2.1678	6 59 57.2	15.562
12	8 37 36.16	2.3618	18 4 52.9	12.146	12	10 25 47.93	2.1651	6 44 23.1	15.596
13	8 39 57.72	2.3568	17 52 40.8	12.256	13	10 27 57.75	2.1624	6 28 47.0	15.618
14	8 42 18.98	2.3518	17 40 22.2	12.364	14	10 30 7.42	2.1596	6 13 8.9	15.649
15	8 44 39.94	2.3469	17 27 57.1	12.471	15	10 32 16.94	2.1574	5 57 29.1	15.678
16	8 47 0.61	2.3420	17 15 25.7	12.576	16	10 34 26.31	2.1550	5 41 47.5	15.706
17	8 49 20.98	2.3371	17 2 48.0	12.679	17	10 36 35.53	2.1526	5 26 4.3	15.732
18	8 51 41.06	2.3322	16 50 4.2	12.780	18	10 38 44.62	2.1503	5 10 19.6	15.757
19	8 54 0.85	2.3274	16 37 14.4	12.880	19	10 40 53.57	2.1481	4 54 33.4	15.781
20	8 56 20.35	2.3225	16 24 18.6	12.979	20	10 43 2.39	2.1460	4 38 45.9	15.808
21	8 58 39.55	2.3177	16 11 16.9	13.076	21	10 45 11.09	2.1440	4 22 57.1	15.823
22	9 0 58.47	2.3129	15 58 9.5	13.171	22	10 47 19.67	2.1421	4 7 7.2	15.842
23	9 3 17.10	2.3080	N. 15 44 56.4	13.264	23	10 49 28.13	2.1402	N. 3 51 16.2	15.860
FRIDAY 22.					SUNDAY 24.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	9 5 35.45	2.3034	N. 15 31 37.8	13.356	0	10 51 36.49	2.1384	N. 3 35 24.1	15.875
1	9 7 53.51	2.2987	15 18 13.7	13.447	1	10 53 44.75	2.1367	3 19 31.1	15.889
2	9 10 11.29	2.2940	15 4 44.2	13.535	2	10 55 52.90	2.1351	3 3 37.4	15.902
3	9 12 28.79	2.2898	14 51 9.4	13.622	3	10 58 0.96	2.1335	2 47 43.0	15.913
4	9 14 46.01	2.2847	14 37 29.5	13.708	4	11 0 8.99	2.1321	2 31 47.9	15.923
5	9 17 2.96	2.2802	14 23 44.4	13.792	5	11 2 16.80	2.1307	2 15 52.3	15.931
6	9 19 19.63	2.2757	14 9 54.4	13.874	6	11 4 24.60	2.1294	1 59 56.2	15.938
7	9 21 36.03	2.2712	13 55 59.5	13.955	7	11 6 32.33	2.1282	1 43 59.7	15.943
8	9 23 52.17	2.2667	13 41 59.8	14.034	8	11 8 39.98	2.1271	1 28 3.0	15.947
9	9 26 8.04	2.2622	13 27 55.4	14.111	9	11 10 47.57	2.1260	1 12 6.1	15.950
10	9 28 23.64	2.2579	13 13 46.5	14.187	10	11 12 55.10	2.1250	0 56 0.0	15.951
11	9 30 38.98	2.2536	12 59 33.0	14.261	11	11 15 2.57	2.1241	0 40 12.0	15.950
12	9 32 54.07	2.2494	12 45 15.2	14.333	12	11 17 9.99	2.1233	0 24 15.0	15.948
13	9 35 8.91	2.2452	12 30 53.1	14.405	13	11 19 17.37	2.1226	N. 0 8 18.2	15.945
14	9 37 23.49	2.2410	12 16 26.8	14.473	14	11 21 24.70	2.1219	S. 0 7 38.4	15.941
15	9 39 37.82	2.2368	12 1 56.4	14.540	15	11 23 32.00	2.1213	0 23 34.7	15.935
16	9 41 51.91	2.2326	11 47 22.0	14.606	16	11 25 39.26	2.1209	0 39 30.6	15.927
17	9 44 5.75	2.2283	11 32 43.7	14.670	17	11 27 46.50	2.1205	0 55 25.9	15.918
18	9 46 19.36	2.2240	11 18 1.6	14.733	18	11 29 53.72	2.1202	1 11 20.7	15.909
19	9 48 32.74	2.2210	11 3 15.8	14.794	19	11 32 0.93	2.1200	1 27 14.8	15.896
20	9 50 45.88	2.2171	10 48 26.3	14.853	20	11 34 8.12	2.1198	1 43 8.2	15.883
21	9 52 58.79	2.2132	10 33 33.3	14.911	21	11 36 15.31	2.1197	1 59 0.8	15.868
22	9 55 11.48	2.2097	10 18 37.0	14.967	22	11 38 22.49	2.1196	2 14 52.4	15.852
23	9 57 23.95	2.2061	10 3 37.4	15.021	23	11 40 29.68	2.1196	2 30 43.0	15.834
24	9 59 36.21	2.2026	N. 9 48 34.5	15.074	24	11 42 36.88	2.1201	S. 2 46 32.5	15.815



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 25.					WEDNESDAY 27.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	11 42 36.88	2.1301	S. 2 46 32.5	15.815	0	13 26 1.77	2.3180	S. 14 37 41.0	12.284
1	11 44 44.09	2.1303	3 2 20.8	15.795	1	13 28 14.78	2.3185	14 50 56.1	12.269
2	11 46 51.32	2.1307	3 18 7.9	15.773	2	13 30 27.99	2.3190	15 4 6.1	12.252
3	11 48 58.57	2.1311	3 33 53.0	15.750	3	13 32 41.41	2.3195	15 17 10.8	12.234
4	11 51 5.85	2.1316	3 49 37.9	15.725	4	13 34 55.05	2.3201	15 30 10.2	12.215
5	11 53 13.16	2.1322	4 5 20.7	15.699	5	13 37 8.91	2.3207	15 43 4.2	12.194
6	11 55 20.51	2.1328	4 21 1.8	15.673	6	13 39 22.98	2.3214	15 55 52.7	12.172
7	11 57 27.90	2.1335	4 36 41.3	15.643	7	13 41 37.37	2.3221	16 8 35.7	12.149
8	11 59 35.33	2.1343	4 52 19.0	15.613	8	13 43 51.79	2.3228	16 21 13.0	12.125
9	12 1 42.82	2.1352	5 7 54.9	15.582	9	13 46 6.53	2.3236	16 33 44.6	12.100
10	12 3 50.36	2.1362	5 23 28.8	15.549	10	13 48 21.50	2.3244	16 46 10.5	12.074
11	12 5 57.97	2.1373	5 39 0.7	15.514	11	13 50 36.70	2.3252	16 58 30.5	12.046
12	12 8 5.64	2.1385	5 54 30.5	15.478	12	13 52 52.12	2.3260	17 10 44.6	12.016
13	12 10 13.38	2.1397	6 9 58.2	15.442	13	13 55 7.77	2.3268	17 22 52.6	12.002
14	12 12 21.20	2.1410	6 25 23.6	15.404	14	13 57 23.86	2.3277	17 34 54.5	11.980
15	12 14 29.10	2.1423	6 40 46.7	15.364	15	13 59 39.78	2.3286	17 46 50.3	11.957
16	12 16 37.08	2.1437	6 56 7.3	15.323	16	14 1 56.13	2.3295	17 58 39.8	11.932
17	12 18 45.15	2.1452	7 11 25.4	15.280	17	14 4 12.72	2.3304	18 10 23.0	11.907
18	12 20 53.31	2.1468	7 26 40.9	15.237	18	14 6 29.54	2.3313	18 21 59.8	11.880
19	12 23 1.56	2.1484	7 41 53.8	15.192	19	14 8 46.60	2.3322	18 33 30.1	11.850
20	12 25 9.92	2.1499	7 57 3.9	15.146	20	14 11 3.89	2.3332	18 44 53.8	11.820
21	12 27 18.38	2.1490	8 12 11.2	15.097	21	14 13 21.42	2.3342	18 56 10.9	11.789
22	12 29 26.96	2.1480	8 27 15.6	15.048	22	14 15 39.20	2.3352	19 7 21.3	11.757
23	12 31 35.66	2.1469	S. 8 42 17.0	14.997	23	14 17 57.22	2.3362	S. 19 18 25.0	11.694
TUESDAY 26.					THURSDAY 28.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	12 33 44.47	2.1478	S. 8 57 15.3	14.945	0	14 20 15.47	2.3369	S. 19 29 21.8	11.620
1	12 35 53.41	2.1490	9 12 10.4	14.892	1	14 22 33.96	2.3378	19 40 11.7	11.574
2	12 38 2.47	2.1501	9 27 2.3	14.838	2	14 24 52.69	2.3387	19 50 54.7	11.527
3	12 40 11.66	2.1513	9 41 50.9	14.782	3	14 27 11.66	2.3396	20 1 30.6	11.480
4	12 42 20.99	2.1527	9 56 36.1	14.724	4	14 29 30.86	2.3405	20 11 59.3	11.431
5	12 44 30.46	2.1541	10 11 17.8	14.665	5	14 31 50.30	2.3414	20 22 20.8	11.380
6	12 46 40.08	2.1555	10 25 55.9	14.605	6	14 34 9.98	2.3423	20 32 35.1	11.327
7	12 48 49.84	2.1569	10 40 30.4	14.544	7	14 36 29.90	2.3432	20 42 42.0	11.274
8	12 50 59.75	2.1583	10 55 1.2	14.481	8	14 38 50.05	2.3441	20 52 41.6	11.220
9	12 53 9.82	2.1597	11 9 28.1	14.417	9	14 41 10.44	2.3450	21 2 33.7	11.165
10	12 55 20.04	2.1611	11 23 51.2	14.352	10	14 43 31.06	2.3459	21 12 18.2	11.109
11	12 57 30.43	2.1625	11 38 10.3	14.285	11	14 45 51.91	2.3468	21 21 55.2	11.052
12	12 59 40.98	2.1639	11 52 25.4	14.217	12	14 48 12.99	2.3477	21 31 24.5	10.994
13	13 1 51.70	2.1652	12 6 36.3	14.147	13	14 50 34.30	2.3486	21 40 46.0	10.935
14	13 4 2.60	2.1665	12 20 43.0	14.076	14	14 52 55.84	2.3495	21 49 59.8	10.875
15	13 6 13.67	2.1679	12 34 45.4	14.004	15	14 55 17.60	2.3504	21 59 5.7	10.814
16	13 8 24.92	2.1691	12 48 43.5	13.931	16	14 57 39.59	2.3513	22 8 3.7	10.752
17	13 10 36.36	2.1703	13 2 37.1	13.856	17	15 0 1.80	2.3522	22 16 53.7	10.689
18	13 12 47.98	2.1715	13 16 26.2	13.780	18	15 2 24.22	2.3531	22 25 35.6	10.625
19	13 14 59.79	2.1727	13 30 10.6	13.702	19	15 4 46.86	2.3540	22 34 9.4	10.560
20	13 17 11.79	2.2016	13 43 50.4	13.623	20	15 7 9.71	2.3549	22 42 35.0	10.494
21	13 19 23.99	2.2049	13 57 25.4	13.543	21	15 9 32.78	2.3558	22 50 52.4	10.427
22	13 21 36.38	2.2082	14 10 55.6	13.461	22	15 11 56.05	2.3567	22 59 1.5	10.359
23	13 23 48.97	2.2116	14 24 20.8	13.378	23	15 14 19.53	2.3576	23 7 2.2	10.290
24	13 26 1.77	2.2150	S. 14 37 41.0	13.294	24	15 16 43.21	2.3585	S. 23 14 54.6	10.220



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 29.					SATURDAY 30.				
0	15 16 43.21	2.3993	S.23 14 54.6	7.802	0	16 15 1.45	2.4544	S.25 39 46.9	4.207
1	15 19 7.09	2.3996	23 22 38.5	7.861	1	16 17 28.75	2.4587	25 43 54.6	4.060
2	15 21 31.16	2.4028	23 30 13.9	7.619	2	16 19 56.13	2.4588	25 47 52.9	3.993
3	15 23 55.43	2.4080	23 37 40.7	7.376	3	16 22 23.58	2.4579	25 51 41.7	3.735
4	15 26 19.88	2.4091	23 44 59.0	7.332	4	16 24 51.08	2.4566	25 55 21.1	3.577
5	15 28 44.52	2.4121	23 52 8.6	7.097	5	16 27 18.64	2.4597	25 58 51.0	3.419
6	15 31 9.33	2.4151	23 59 9.5	6.841	6	16 29 46.24	2.4604	26 2 11.4	3.261
7	15 33 34.32	2.4160	24 6 1.6	6.795	7	16 32 13.89	2.4611	26 5 22.3	3.102
8	15 35 59.49	2.4208	24 12 44.9	6.648	8	16 34 41.57	2.4616	26 8 23.6	2.943
9	15 38 24.82	2.4286	24 19 19.3	6.500	9	16 37 9.28	2.4620	26 11 15.4	2.783
10	15 40 50.32	2.4292	24 25 44.9	6.351	10	16 39 37.01	2.4623	26 13 57.6	2.625
11	15 43 15.97	2.4298	24 32 1.5	6.302	11	16 42 4.76	2.4628	26 16 30.3	2.466
12	15 45 41.77	2.4313	24 38 9.2	6.062	12	16 44 32.51	2.4636	26 18 53.5	2.307
13	15 48 7.72	2.4327	24 44 7.8	5.902	13	16 47 0.26	2.4626	26 21 7.1	2.147
14	15 50 33.82	2.4360	24 49 57.4	5.750	14	16 49 28.01	2.4628	26 23 11.1	1.988
15	15 53 0.05	2.4383	24 55 37.9	5.606	15	16 51 55.74	2.4620	26 25 5.6	1.828
16	15 55 26.42	2.4405	25 1 9.2	5.445	16	16 54 23.45	2.4616	26 28 50.5	1.668
17	15 57 52.91	2.4426	25 6 31.4	5.392	17	16 56 51.13	2.4611	26 28 25.8	1.509
18	16 0 19.53	2.4445	25 11 44.3	5.138	18	16 59 18.78	2.4604	26 29 51.6	1.349
19	16 2 46.26	2.4464	25 16 48.0	4.984	19	17 1 46.38	2.4596	26 31 7.8	1.190
20	16 5 13.10	2.4482	25 21 42.4	4.829	20	17 4 13.93	2.4587	26 32 14.4	1.031
21	16 7 40.05	2.4499	25 26 27.5	4.674	21	17 6 41.43	2.4577	26 33 11.5	0.873
22	16 10 7.09	2.4518	25 31 3.3	4.519	22	17 9 8.96	2.4566	26 33 59.1	0.714
23	16 12 34.23	2.4530	25 35 29.8	4.363	23	17 11 36.22	2.4553	26 34 37.2	0.556
24	16 15 1.45	2.4544	S.25 39 46.9	4.207	24	17 14 3.51	2.4541	S.26 35 5.7	0.397

PHASES OF THE MOON.

○ Full Moon,	Day. h. m.
☾ Last Quarter,	3 4 45.9
● New Moon,	11 1 4.3
☾ First Quarter,	18 17 23.7
	25 12 36.1

☾ Apogee,	Day. h.
☾ Perigee,	10 15.2
	22 21.5



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
1	Jupiter W.	108 35 40	2408	110 19 10	2410	112 2 30	2417	113 45 40	2424
	Venus W.	108 54 8	2374	110 33 39	2360	112 13 1	2367	113 52 14	2368
	Saturn W.	82 20 53	2372	84 5 8	2378	85 49 14	2385	87 33 10	2388
	Regulus W.	75 6 10	2340	76 50 57	2355	78 35 35	2364	80 20 3	2360
	Spica W.	21 9 38	2387	22 53 32	2387	24 37 25	2390	26 21 14	2393
	Mars E.	75 45 12	2408	74 1 42	2410	72 18 22	2417	70 35 11	2424
	$\alpha$ Aquilæ E.	81 9 41	2396	79 38 48	2391	78 8 12	2396	76 37 54	2392
2	Saturn W.	96 10 2	2424	97 52 48	2443	99 35 21	2453	101 17 41	2462
	Regulus W.	88 59 42	2410	90 43 2	2419	92 26 9	2429	94 9 3	2438
	Spica W.	34 58 42	2423	36 41 44	2431	38 24 35	2438	40 7 15	2447
	Mars E.	62 1 57	2464	60 19 53	2473	58 38 2	2483	56 56 25	2492
	$\alpha$ Aquilæ E.	69 12 8	3119	67 44 22	3145	66 17 7	3175	64 50 28	3205
	Fomalhaut E.	93 0 40	2792	91 25 48	2791	89 51 8	2801	88 16 41	2811
3	Saturn W.	109 45 48	2516	111 26 41	2590	113 7 18	2586	114 47 39	2580
	Regulus W.	102 40 1	2420	104 21 28	2502	106 2 39	2512	107 43 35	2525
	Spica W.	48 37 21	2426	50 18 41	2507	51 59 45	2517	53 40 34	2526
	Mars E.	48 31 45	2545	46 51 35	2556	45 11 40	2568	43 32 1	2580
	$\alpha$ Aquilæ E.	57 47 15	3399	56 24 57	3447	55 3 34	3497	53 43 7	3554
	Fomalhaut E.	80 28 7	2576	78 55 17	2601	77 22 47	2606	75 50 38	2595
	$\alpha$ Pegasi E.	101 42 7	2564	100 4 25	2608	98 26 56	2673	96 49 40	2693
4	Spica W.	62 0 42	2588	63 39 54	2599	65 18 50	2612	66 57 28	2624
	Mars E.	35 18 4	2646	33 40 12	2660	32 2 38	2674	30 25 23	2680
	Fomalhaut E.	68 15 51	3029	66 46 14	3062	65 17 6	3078	63 48 29	3108
	$\alpha$ Pegasi E.	88 46 59	2742	87 11 15	2755	85 35 48	2768	84 0 38	2782
5	Spica W.	75 6 21	2689	76 43 15	2702	78 19 52	2715	79 56 12	2729
	Antares W.	29 16 55	2684	30 53 57	2695	32 30 42	2710	34 7 9	2722
	Fomalhaut E.	56 33 56	3269	55 8 56	3296	53 44 39	3323	52 21 6	3374
	$\alpha$ Pegasi E.	76 9 28	2686	74 36 13	2672	73 3 18	2687	71 30 43	2696
	$\alpha$ Arietis E.	118 35 14	2704	116 58 39	2716	115 22 20	2729	113 46 18	2741
6	Spica W.	87 53 29	2794	89 28 5	2805	91 2 25	2816	92 36 29	2831
	Antares W.	42 5 6	2788	43 39 50	2800	45 14 18	2813	46 48 29	2826
	Fomalhaut E.	45 36 0	3024	44 17 52	3036	43 0 49	3053	41 44 58	3081
	$\alpha$ Pegasi E.	63 53 13	2992	62 22 50	3010	60 52 50	3030	59 23 14	3049
	$\alpha$ Arietis E.	105 50 17	2804	104 15 54	2817	102 41 48	2828	101 7 57	2840
7	Spica W.	100 22 51	2991	101 55 22	2992	103 27 38	2992	104 59 41	2994
	Antares W.	54 35 29	2985	56 8 7	2996	57 40 32	2997	59 12 42	2997
	$\alpha$ Pegasi E.	52 1 25	3156	50 34 22	3179	49 7 48	3204	47 41 43	3236
	$\alpha$ Arietis E.	93 22 36	2900	91 50 17	2911	90 18 12	2922	88 46 22	2931
	SUN E.	134 35 28	3253	133 10 22	3265	131 45 29	3276	130 20 49	3286
8	Antares W.	66 50 17	2996	68 21 12	2976	69 51 55	2984	71 22 28	2993
	Mars W.	15 20 15	3092	16 48 46	3092	18 17 18	3092	19 45 50	3092
	$\alpha$ Pegasi E.	40 39 18	3379	39 16 38	3416	37 54 39	3454	36 33 24	3489
	$\alpha$ Arietis E.	81 10 23	2983	79 39 49	2991	78 9 25	3001	76 39 13	3006
	SUN E.	123 20 31	3337	121 57 2	3346	120 33 44	3355	119 10 36	3363
9	Antares W.	78 52 47	3027	80 22 26	3032	81 51 59	3039	83 21 24	3043
	Mars W.	27 8 30	3098	28 36 56	3091	30 5 17	3098	31 33 34	3096
	$\alpha$ Arietis E.	69 10 36	3045	67 41 19	3052	66 12 10	3056	64 43 7	3061



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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Jupiter W.	115 28 40	2432	117 11 29	2441	118 54 6	2448	120 36 32	2458
	Venus W.	115 31 18	2601	117 10 11	2609	118 48 54	2617	120 27 26	2626
	Saturn W.	89 16 55	2401	91 0 29	2408	92 43 52	2417	94 27 3	2425
	Regulus W.	82 4 22	2379	83 48 30	2384	85 32 26	2394	87 16 10	2402
	Spica W.	28 4 59	2398	29 48 37	2403	31 32 7	2409	33 15 29	2415
	Mars E.	68 52 10	2431	67 9 20	2430	65 26 41	2448	63 44 14	2455
	$\alpha$ Aquilæ E.	75 7 56	2080	73 38 21	2080	72 9 10	2072	70 40 26	2068
2	Saturn W.	102 59 48	2473	104 41 41	2482	106 23 19	2488	108 4 42	2496
	Regulus W.	95 51 43	2448	97 34 9	2458	99 16 21	2468	100 58 19	2480
	Spica W.	41 49 43	2456	43 31 58	2465	45 14 0	2475	46 55 48	2486
	Mars E.	55 15 1	2502	53 33 50	2512	51 52 53	2522	50 12 12	2533
	$\alpha$ Aquilæ E.	63 24 25	2329	61 59 2	2375	60 34 21	2313	59 10 24	2354
	Fomalhaut E.	86 42 27	2621	85 8 27	2634	83 34 43	2647	82 1 16	2661
3	Saturn W.	116 27 43	2561	118 7 31	2574	119 47 1	2587	121 26 14	2601
	Regulus W.	109 24 14	2537	111 4 36	2548	112 44 42	2561	114 24 31	2573
	Spica W.	55 21 8	2540	57 1 26	2552	58 41 27	2568	60 21 13	2575
	Mars E.	41 52 39	2508	40 13 34	2506	38 34 46	2518	36 56 16	2532
	$\alpha$ Aquilæ E.	52 23 42	2513	51 5 22	2577	49 48 11	2748	48 32 15	2822
	Fomalhaut E.	74 18 51	2944	72 47 28	2964	71 16 30	2984	69 45 57	3008
	$\alpha$ Pegasi E.	95 12 37	2994	93 35 49	2705	91 59 16	2718	90 23 0	2729
4	Spica W.	68 35 50	2538	70 13 54	2561	71 51 40	2588	73 29 9	2676
	Mars E.	28 48 29	2705	27 11 56	2721	25 35 44	2738	23 59 55	2755
	Fomalhaut E.	62 20 23	2122	60 52 52	2161	59 25 56	2191	57 50 36	2225
	$\alpha$ Pegasi E.	82 25 46	2796	80 51 13	2811	79 16 59	2826	77 43 4	2840
5	Spica W.	81 32 13	2742	83 7 57	2764	84 43 25	2768	86 18 35	2780
	Antares W.	35 43 19	2726	37 19 11	2748	38 54 47	2762	40 30 5	2775
	Fomalhaut E.	50 58 20	2417	49 36 23	2464	48 15 19	2514	46 55 10	2567
	$\alpha$ Pegasi E.	69 58 30	2920	68 26 37	2929	66 55 7	2956	65 23 59	2973
	$\alpha$ Arietis E.	112 10 33	2762	110 35 4	2766	108 59 52	2779	107 24 56	2792
6	Spica W.	94 10 17	2844	95 43 48	2855	97 17 4	2867	98 50 5	2879
	Antares W.	48 22 24	2987	49 56 4	2990	51 29 27	2991	53 2 36	2973
	Fomalhaut E.	40 30 21	2906	39 17 6	2900	38 5 17	4082	36 54 58	4123
	$\alpha$ Pegasi E.	57 54 2	2989	56 25 14	2990	54 56 52	3111	53 28 56	3132
	$\alpha$ Arietis E.	99 34 21	2988	98 1 2	2986	96 27 59	2976	94 55 9	2989
7	Spica W.	106 31 29	2985	108 3 4	2945	109 34 26	2934	111 5 36	2965
	Antares W.	60 44 39	2926	62 16 22	2928	63 47 53	2948	65 19 11	2966
	$\alpha$ Pegasi E.	46 16 7	2366	44 51 4	2364	43 26 34	2314	42 2 38	2345
	$\alpha$ Arietis E.	87 14 44	2942	85 43 20	2934	84 12 9	2963	82 41 10	2973
	SUN E.	128 56 21	2397	127 32 6	2396	126 8 2	2318	124 44 11	2327
8	Antares W.	72 52 50	3001	74 23 2	3008	75 53 5	3014	77 23 0	3021
	Mars W.	21 14 22	2982	22 42 54	3061	24 11 26	3081	25 39 59	3081
	$\alpha$ Pegasi E.	35 12 58	2545	33 53 23	2596	32 34 44	2654	31 17 8	2712
	$\alpha$ Arietis E.	75 9 10	3017	73 39 18	3024	72 9 35	3032	70 40 2	3038
	SUN E.	117 47 37	2371	116 24 47	2379	115 2 6	2386	113 39 34	2398
9	Antares W.	84 50 43	3048	86 19 56	3092	87 49 5	3055	89 18 10	3059
	Mars W.	33 1 48	2998	34 30 0	3101	35 58 9	3102	37 26 16	3104
	$\alpha$ Arietis E.	63 14 10	2999	61 45 21	2972	60 16 37	2976	58 47 58	2979



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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
9	SUN E.	119° 17' 10"	3400	110° 54' 53"	3405	109° 39' 49"	3410	108° 10' 37"	3416
10	Antares W.	90 47 10	3080	92 16 8	3084	93 45 9	3086	95 13 55	3087
	α Aquilæ W.	45 9 8	4457	46 6 38	4380	47 12 8	4336	48 18 35	4371
	Mars W.	38 54 21	3106	40 22 25	3105	41 50 29	3106	43 18 34	3106
	α Arietis E.	57 19 23	3083	55 50 53	3086	54 22 26	3089	52 54 2	3080
	SUN E.	101 21 33	3434	99 59 55	3437	98 38 20	3438	97 16 47	3439
11	Antares W.	109 38 6	3085	104 6 59	3084	105 35 53	3081	107 4 50	3069
	α Aquilæ W.	54 2 45	4048	55 13 39	4010	56 25 9	3974	57 37 14	3943
	Mars W.	50 39 2	3098	52 7 14	3098	53 35 29	3098	55 3 48	3098
	α Arietis E.	45 32 33	3096	44 4 18	3098	42 36 3	3094	41 7 47	3096
	SUN E.	90 29 9	3438	89 7 35	3436	87 45 59	3433	86 24 20	3431
12	α Aquilæ W.	63 45 19	3804	65 0 10	3781	66 15 32	3797	67 31 19	3735
	Mars W.	62 26 38	3086	63 55 31	3089	65 24 31	3090	66 53 39	3048
	Fomalhaut W.	39 7 18	4117	40 17 3	4045	41 27 58	3981	42 39 56	3922
	α Arietis E.	33 46 14	3090	32 17 52	3088	30 49 28	3087	29 21 3	3087
	SUN E.	79 35 4	3409	78 12 56	3401	76 50 41	3395	75 28 19	3399
13	Mars W.	74 21 43	3098	75 51 59	3099	77 22 13	3099	78 52 47	3073
	α Aquilæ W.	73 55 47	3096	75 13 42	3018	76 31 57	3099	77 50 32	3068
	Fomalhaut W.	48 53 27	3088	50 10 32	3044	51 28 19	3090	52 46 47	3072
	SUN E.	68 34 21	3347	67 11 4	3339	65 47 36	3327	64 23 56	3317
14	Mars W.	86 28 56	3216	88 0 54	3204	89 33 7	3208	91 5 35	3200
	α Aquilæ W.	84 27 51	3305	85 48 9	3493	87 8 42	3477	88 29 32	3464
	Fomalhaut W.	59 28 6	3419	60 50 1	3393	62 12 27	3365	63 35 23	3340
	α Pegasi W.	36 45 27	3365	38 8 24	3322	39 32 9	3270	40 56 39	3246
	SUN E.	57 22 27	3369	55 57 28	3347	54 32 15	3338	53 6 45	3321
15	Mars W.	98 52 9	3218	100 26 20	3799	102 0 49	3786	103 35 27	3771
	α Aquilæ W.	95 17 7	3409	96 39 15	3389	98 1 34	3389	99 24 4	3379
	Fomalhaut W.	70 37 3	3235	72 2 43	3304	73 28 47	3184	75 55 15	3168
	α Pegasi W.	48 9 23	3091	49 37 44	3068	51 6 39	3086	52 36 5	3013
	SUN E.	45 55 26	3153	44 28 20	3129	43 0 58	3134	41 33 18	3110
16	Fomalhaut W.	82 13 27	3072	83 42 11	3066	85 11 15	3038	86 40 40	3023
	α Pegasi W.	60 10 45	3099	61 43 5	3078	63 15 52	3040	64 49 4	3036
	SUN E.	34 10 37	3089	32 41 12	3034	31 11 29	3011	29 41 30	2997
21	SUN W.	29 44 43	2676	31 24 11	2670	33 3 47	2664	34 43 31	2660
	Spica E.	81 55 5	2361	80 8 8	2360	78 21 7	2353	76 33 59	2351
22	SUN W.	43 3 38	2642	44 43 52	2640	46 24 9	2640	48 4 27	2639
	Jupiter W.	15 52 23	2297	17 38 27	2296	19 24 33	2295	21 10 40	2295
	Spica E.	67 37 26	2341	65 49 59	2340	64 2 31	2340	62 15 3	2340
	Antares E.	113 23 32	2232	111 35 54	2233	109 48 16	2232	108 0 36	2232
23	SUN W.	56 26 7	2640	58 6 25	2641	59 46 41	2642	61 26 56	2644
	Jupiter W.	30 1 11	2296	31 47 13	2299	33 23 14	2291	35 19 12	2298
	Venus W.	24 15 20	2286	26 1 41	2285	27 48 3	2285	29 34 23	2285
	Spica E.	53 17 50	2345	51 30 29	2346	49 43 10	2346	47 55 54	2341
	Antares E.	99 2 17	2234	97 14 40	2235	95 27 6	2235	93 39 35	2239



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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
9	SUN E.	106 48 39	3421	105 26 46	3425	104 4 58	3429	102 43 14	3431
10	Antares W.	96 42 45	3067	98 11 35	3067	99 40 25	3067	101 9 15	3065
	$\alpha$ Aquilæ W.	49 25 54	3220	50 34 1	3172	51 42 54	3128	52 52 29	3085
	Mars W.	44 46 37	3105	46 14 41	3104	47 42 46	3102	49 10 53	3101
	$\alpha$ Arietis E.	51 25 40	3083	49 57 21	3094	48 29 4	3095	47 0 48	3098
	SUN E.	95 55 15	3440	94 33 44	3440	93 12 13	3439	91 50 41	3439
11	Antares W.	108 33 50	3089	110 2 54	3083	111 32 3	3047	113 1 17	3043
	$\alpha$ Aquilæ W.	58 49 51	3212	60 2 59	3254	61 16 35	3255	62 30 40	3229
	Mars W.	56 32 19	3095	58 0 40	3081	59 29 13	3076	60 57 52	3070
	$\alpha$ Arietis E.	39 39 31	3094	38 11 14	3082	36 42 55	3091	35 14 35	3091
	SUN E.	85 2 38	3427	83 40 52	3423	82 19 1	3416	80 57 5	3414
12	$\alpha$ Aquilæ W.	68 47 29	3714	70 4 1	3698	71 20 55	3674	72 38 10	3663
	Mars W.	68 22 56	3087	69 52 23	3080	71 21 59	3021	72 51 46	3013
	Fomalhaut W.	43 52 53	3087	45 6 46	3317	46 21 31	3708	47 37 6	3726
	$\alpha$ Arietis E.	27 52 39	3087	26 24 13	3088	24 55 49	3090	23 27 27	3094
	SUN E.	74 5 50	3381	72 43 12	3372	71 20 25	3355	69 57 28	3355
13	Mars W.	80 23 33	3063	81 54 32	3062	83 25 45	3040	84 57 13	3028
	$\alpha$ Aquilæ W.	79 9 25	3657	80 28 35	3650	81 48 4	3635	83 7 49	3620
	Fomalhaut W.	54 5 52	3698	55 25 34	3696	56 45 51	3476	58 6 42	3446
	SUN E.	63 0 4	3305	61 36 0	3295	60 11 43	3288	58 47 12	3271
14	Mars W.	92 38 20	3005	94 11 22	3002	95 44 41	3041	97 18 16	3037
	$\alpha$ Aquilæ W.	89 50 36	3422	91 11 54	3440	92 33 25	3428	93 55 10	3417
	Fomalhaut W.	64 58 48	3315	66 22 42	3292	67 47 3	3270	69 11 49	3247
	$\alpha$ Pegasi W.	42 21 54	3212	43 47 49	3178	45 14 24	3148	46 41 35	3118
	SUN E.	51 41 1	3209	50 15 2	3196	48 48 47	3161	47 22 15	3167
15	Mars W.	105 10 43	3755	106 46 9	3742	108 21 53	3729	109 57 55	3716
	$\alpha$ Aquilæ W.	100 46 44	3372	102 9 32	3366	103 32 28	3360	104 55 30	3356
	Fomalhaut W.	78 29 8	3144	77 49 24	3125	79 17 3	3107	80 45 3	3098
	$\alpha$ Pegasi W.	54 6 2	3099	55 36 29	3095	57 7 26	3042	58 38 52	3020
	SUN E.	40 5 21	3095	38 37 6	3081	37 8 33	3068	35 39 44	3053
16	Fomalhaut W.	88 10 24	3008	89 40 27	3004	91 10 47	3079	92 41 26	3067
	$\alpha$ Pegasi W.	66 22 43	3230	67 56 45	3200	69 31 13	3722	71 6 5	3705
	SUN E.	28 11 14	3095	26 40 42	3072	25 9 54	3090	23 38 51	3090
21	SUN W.	36 23 22	2646	38 3 19	2651	39 43 21	2648	41 23 28	2645
	Spica E.	74 46 48	2248	72 59 32	2245	71 12 12	2244	69 24 50	2243
22	SUN W.	49 44 46	2688	51 25 7	2688	53 5 27	2636	54 45 47	2636
	Jupiter W.	22 56 47	2295	24 42 54	2295	26 29 1	2295	28 15 7	2297
	Spica E.	60 27 35	2240	58 40 7	2241	56 52 40	2241	55 5 14	2243
	Antares E.	106 12 56	2231	104 25 15	2232	102 37 35	2233	100 49 56	2233
23	SUN W.	63 7 8	2646	64 47 17	2648	66 27 23	2651	68 7 26	2654
	Jupiter W.	37 5 7	2205	38 50 59	2205	40 36 47	2210	42 22 32	2213
	Venus W.	31 20 44	2287	33 7 3	2287	34 53 21	2289	36 39 36	2290
	Spica E.	46 8 42	2244	44 21 35	2287	42 34 32	2261	40 47 35	2265
	Antares E.	91 52 5	2241	90 4 39	2244	88 17 17	2247	86 30 0	2249



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Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
24	Sun W.	69 47 24	2507	71 27 18	2560	73 7 8	2564	74 46 52	2567
	Jupiter W.	44 8 12	2317	45 53 47	2320	47 39 18	2324	49 24 43	2327
	Venus W.	38 25 50	2303	40 12 0	2304	41 58 8	2306	43 44 13	2308
	Saturn W.	20 46 37	2330	22 31 53	2327	24 17 13	2326	26 2 35	2324
	Spica E.	39 0 44	2309	37 13 59	2274	35 27 22	2279	33 40 51	2285
	Antares E.	84 42 45	2243	82 55 36	2246	81 8 32	2250	79 21 32	2253
25	Sun W.	83 4 14	2589	84 43 24	2593	86 22 28	2590	88 1 24	2606
	Jupiter W.	58 10 24	2349	59 55 12	2353	61 39 54	2347	63 24 30	2363
	Venus W.	52 33 43	2313	54 19 24	2316	56 5 0	2318	57 50 33	2322
	Saturn W.	34 49 19	2333	36 34 31	2336	38 19 38	2339	40 4 40	2344
	Antares E.	70 28 0	2284	68 41 37	2288	66 55 20	2294	65 9 11	2295
	Mars E.	122 2 21	2267	120 15 33	2270	118 28 49	2274	116 42 11	2278
26	Sun W.	96 14 15	2632	97 52 27	2638	99 30 31	2643	101 8 27	2650
	Jupiter W.	72 5 38	2389	73 49 28	2395	75 33 10	2401	77 16 44	2406
	Venus W.	66 36 54	2342	68 21 53	2345	70 6 47	2350	71 51 34	2354
	Saturn W.	48 48 20	2306	50 39 44	2371	52 17 0	2376	54 1 9	2381
	Regulus W.	43 40 2	2334	45 25 12	2339	47 10 15	2344	48 55 11	2349
	Antares E.	56 20 10	2324	54 34 46	2330	52 49 30	2335	51 4 21	2340
27	Mars E.	107 50 32	2300	106 4 32	2304	104 18 39	2309	102 32 53	2315
	Sun W.	109 16 1	2691	110 53 6	2698	112 30 2	2695	114 6 49	2701
	Jupiter W.	85 52 28	2436	87 35 11	2443	89 17 44	2449	90 0 9	2456
	Venus W.	80 33 57	2376	82 18 6	2381	84 2 8	2386	85 46 3	2391
	Saturn W.	62 39 58	2410	64 23 19	2416	66 6 31	2421	67 49 35	2426
	Regulus W.	57 37 54	2377	59 22 2	2383	61 6 1	2389	62 49 52	2396
28	Antares E.	42 20 43	2371	40 36 26	2376	38 52 17	2382	37 8 17	2389
	Mars E.	93 45 59	2342	92 1 0	2348	90 16 10	2353	88 31 28	2359
	$\alpha$ Aquilæ E.	96 27 1	2376	94 56 18	2379	93 25 39	2383	91 55 5	2387
	Sun W.	122 8 25	2738	123 44 16	2744	125 19 57	2750	126 55 27	2760
	Jupiter W.	99 29 54	2489	101 11 23	2497	102 52 41	2503	104 33 50	2510
	Venus W.	94 23 52	2417	96 7 3	2422	97 50 7	2426	99 33 4	2432
29	Saturn W.	76 22 38	2480	78 4 47	2487	79 46 46	2475	81 28 35	2482
	Regulus W.	71 26 52	2426	73 9 48	2434	74 52 35	2441	76 35 12	2448
	Mars E.	79 50 8	2391	78 6 20	2397	76 22 40	2403	74 39 11	2411
	$\alpha$ Aquilæ E.	84 24 14	2629	82 54 37	2640	81 25 14	2638	79 56 7	2656
	Fomalhaut E.	109 0 40	2348	107 27 14	2347	105 53 47	2346	104 20 19	2347
	Venus W.	108 5 47	2461	109 47 55	2467	111 29 54	2474	113 11 44	2480
30	Saturn W.	89 55 9	2518	91 35 57	2526	93 16 34	2533	94 57 1	2541
	Regulus W.	85 5 46	2484	86 47 22	2491	88 28 48	2499	90 10 3	2507
	Spica W.	31 5 53	2501	32 47 5	2507	34 28 8	2513	36 9 3	2519
	Mars E.	66 4 15	2447	64 21 47	2455	62 39 30	2462	60 57 23	2470
	$\alpha$ Aquilæ E.	72 35 6	3158	71 8 0	3174	69 41 20	3196	68 15 6	3220
	Fomalhaut E.	96 33 37	2863	95 0 31	2869	93 27 33	2875	91 54 42	2883
31	Saturn W.	103 16 27	2883	104 55 46	2891	106 34 53	2899	108 13 49	2906
	Spica W.	44 31 21	2554	46 11 19	2562	47 51 6	2570	49 30 42	2577
	Mars E.	52 29 46	2613	50 48 51	2623	49 8 9	2631	47 27 39	2642
	$\alpha$ Aquilæ E.	61 11 55	3372	59 49 7	3410	58 27 2	3449	57 5 41	3482
	Fomalhaut E.	84 13 2	2928	82 41 19	2939	81 9 49	2960	79 38 34	2965
	$\alpha$ Pegasi E.	105 40 36	2712	104 4 12	2718	102 27 56	2726	100 51 49	2732



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
24	Sun W.	76 26 32	2372	78 6 6	2376	79 45 34	2380	81 24 57	2384
	Jupiter W.	51 10 3	2381	52 55 17	2385	54 40 26	2389	56 25 28	2394
	Venus W.	45 30 15	2301	47 16 13	2304	49 2 7	2307	50 47 57	2309
	Saturn W.	27 47 59	2323	29 33 22	2326	31 18 44	2328	33 4 3	2330
	Spica E.	31 54 29	2291	30 8 17	2296	28 22 14	2304	26 36 21	2313
	Antares E.	77 34 38	2267	75 47 50	2270	74 1 7	2274	72 14 30	2279
25	Sun W.	89 40 12	2610	91 18 54	2615	92 57 28	2621	94 35 50	2626
	Jupiter W.	65 8 58	2349	66 53 19	2373	68 37 33	2378	70 21 40	2384
	Venus W.	59 36 0	2336	61 21 21	2330	63 6 37	2333	64 51 48	2337
	Saturn W.	41 49 36	2348	43 34 26	2351	45 19 11	2356	47 3 49	2361
	Antares E.	63 23 7	2303	61 37 12	2308	59 51 24	2313	58 5 43	2318
	Mars E.	114 55 39	2292	113 9 13	2296	111 22 53	2292	109 36 39	2296
26	Sun W.	102 46 14	2636	104 23 53	2662	106 1 24	2666	107 38 47	2675
	Jupiter W.	79 0 10	2412	80 43 27	2418	82 26 36	2424	84 9 37	2431
	Venus W.	73 36 15	2326	75 20 50	2322	77 5 19	2326	78 49 42	2373
	Saturn W.	55 45 11	2387	57 29 5	2392	59 12 51	2398	60 56 29	2404
	Regulus W.	50 40 0	2355	52 24 40	2360	54 9 12	2365	55 53 37	2371
	Antares E.	49 19 20	2346	47 34 28	2353	45 39 45	2358	44 5 10	2364
27	Mars E.	100 47 15	2320	99 1 44	2325	97 16 21	2331	95 31 6	2336
	Sun W.	115 43 27	2708	117 19 56	2716	118 56 15	2722	120 32 25	2729
	Jupiter W.	92 42 25	2402	94 24 31	2409	96 6 28	2476	97 48 16	2482
	Venus W.	87 29 51	2396	89 13 32	2401	90 57 6	2406	92 40 32	2410
	Saturn W.	69 32 30	2434	71 15 16	2441	72 57 52	2447	74 40 20	2454
	Regulus W.	64 33 34	2401	66 17 7	2408	68 0 31	2414	69 43 46	2422
28	Antares E.	35 24 26	2396	33 40 45	2408	31 57 14	2408	30 13 51	2414
	Mars E.	86 46 54	2356	85 2 29	2371	83 18 13	2378	81 34 6	2384
	$\alpha$ Aquilæ E.	90 24 36	2994	88 54 16	3001	87 24 4	3009	85 54 3	3019
	Sun W.	128 30 48	2767	130 5 59	2775	131 40 59	2779	133 15 49	2791
	Jupiter W.	106 14 49	2517	107 55 38	2525	109 36 17	2538	111 16 45	2540
	Venus W.	101 15 53	2438	102 58 33	2443	104 41 6	2449	106 23 31	2455
29	Saturn W.	83 10 14	2496	84 51 43	2496	86 33 2	2508	88 14 11	2511
	Regulus W.	78 17 39	2455	79 59 56	2462	81 42 2	2469	83 23 59	2476
	Mars E.	72 55 52	2417	71 12 42	2426	69 29 43	2432	67 46 54	2439
	$\alpha$ Aquilæ E.	78 27 15	3091	76 58 42	3097	75 30 29	3114	74 2 36	3133
	Fomalhaut E.	102 46 52	2648	101 13 27	2652	99 40 6	2656	98 0 49	2659
	Venus W.	114 53 26	2487	116 34 58	2492	118 16 22	2499	119 57 37	2506
30	Saturn W.	96 37 17	2550	98 17 21	2557	99 57 15	2566	101 36 57	2574
	Regulus W.	91 51 7	2516	93 32 0	2523	95 12 41	2530	96 53 12	2538
	Spica W.	37 49 50	2626	39 30 27	2633	41 50 55	2640	42 51 13	2647
	Mars E.	59 15 28	2479	57 33 45	2487	55 52 13	2496	54 10 53	2504
	$\alpha$ Aquilæ E.	66 49 21	3247	65 24 8	3276	63 59 28	3306	62 35 23	3338
	Fomalhaut E.	90 22 1	2899	88 49 29	2898	87 17 8	2906	85 44 59	2917
30	Saturn W.	109 52 33	2618	111 31 4	2626	113 9 23	2635	114 47 30	2645
	Spica W.	51 10 8	2596	52 49 22	2604	54 28 25	2608	56 7 16	2611
	Mars E.	45 47 24	2551	44 7 22	2562	42 27 35	2573	40 48 2	2584
	$\alpha$ Aquilæ E.	55 45 8	3358	54 25 26	3368	53 6 39	3641	51 48 49	3700
	Fomalhaut E.	78 7 37	2977	76 36 56	2992	75 6 33	3007	73 36 29	3023
	$\alpha$ Pegasi E.	99 15 51	2738	97 40 2	2745	96 4 22	2764	94 28 53	2782



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S										Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour.	Semi-diameter.					
		h.	m.	s.		°	'	"			°				'
Sun.	1	6	42	35.96	10.332	N.23	5	49.4	10.51	15	46.15	68.78	3	32.84	0.475
Mon.	2	6	46	43.82	10.320	23	1	25.0	11.51	15	46.16	68.74	3	44.12	0.463
Tues.	3	6	50	51.39	10.307	22	56	36.5	12.52	15	46.17	68.69	3	55.11	0.451
Wed.	4	6	54	58.67	10.294	22	51	24.1	13.51	15	46.18	68.64	4	5.79	0.438
Thur.	5	6	59	5.62	10.281	22	45	47.8	14.50	15	46.19	68.59	4	16.15	0.424
Fri.	6	7	3	12.23	10.267	22	39	47.8	15.48	15	46.20	68.54	4	26.18	0.410
Sat.	7	7	7	18.50	10.253	22	33	24.2	16.46	15	46.22	68.49	4	35.86	0.396
Sun.	8	7	11	24.41	10.237	22	26	37.2	17.44	15	46.24	68.44	4	45.19	0.386
Mon.	9	7	15	29.94	10.221	22	19	26.8	18.41	15	46.27	68.39	4	54.13	0.364
Tues.	10	7	19	35.07	10.205	22	11	53.2	19.37	15	46.30	68.33	5	2.67	0.347
Wed.	11	7	24	39.78	10.188	22	3	56.7	20.33	15	46.33	68.27	5	10.81	0.329
Thur.	12	7	27	44.06	10.170	21	55	37.4	21.27	15	46.36	68.20	5	18.51	0.311
Fri.	13	7	31	47.90	10.150	21	46	55.4	22.21	15	46.40	68.13	5	25.77	0.292
Sat.	14	7	35	51.27	10.130	21	37	51.0	23.14	15	46.45	68.06	5	32.56	0.273
Sun.	15	7	39	54.16	10.110	21	28	24.4	24.06	15	46.50	67.99	5	38.88	0.252
Mon.	16	7	43	56.55	10.089	21	18	35.8	24.97	15	46.56	67.92	5	44.70	0.232
Tues.	17	7	47	58.43	10.067	21	8	25.5	25.87	15	46.62	67.85	5	50.01	0.210
Wed.	18	7	51	59.78	10.044	20	57	53.6	26.76	15	46.69	67.78	5	54.79	0.188
Thur.	19	7	56	0.60	10.021	20	47	0.4	27.65	15	46.77	67.70	5	59.04	0.165
Fri.	20	8	0	0.86	9.998	20	35	46.2	28.52	15	46.85	67.62	6	2.73	0.142
Sat.	21	8	4	0.56	9.975	20	24	11.2	29.38	15	46.93	67.54	6	5.86	0.118
Sun.	22	8	7	59.67	9.951	20	12	15.8	30.23	15	47.02	67.46	6	8.41	0.094
Mon.	23	8	11	58.20	9.927	20	0	0.2	31.07	15	47.12	67.38	6	10.38	0.070
Tues.	24	8	15	56.15	9.902	19	47	24.5	31.89	15	47.22	67.30	6	11.77	0.045
Wed.	25	8	19	53.48	9.877	19	34	29.1	32.70	15	47.33	67.22	6	12.54	0.020
Thur.	26	8	23	50.19	9.851	19	21	14.4	33.50	15	47.44	67.14	6	12.68	0.006
Fri.	27	8	27	46.28	9.825	19	7	40.5	34.30	15	47.55	67.05	6	12.21	0.082
Sat.	28	8	31	41.75	9.799	18	53	47.9	35.08	15	47.67	66.96	6	11.13	0.058
Sun.	29	8	35	36.60	9.773	18	39	36.6	35.85	15	47.79	66.88	6	9.44	0.063
Mon.	30	8	39	30.84	9.747	18	25	6.9	36.61	15	47.91	66.80	6	7.13	0.109
Tues.	31	8	43	24.47	9.722	18	10	19.2	37.36	15	48.04	66.71	6	4.21	0.134
Wed.	32	8	47	17.49	9.697	N.17	55	13.7	38.09	15	48.17	66.62	6	0.68	0.160

NOTE. — Mean Time of the Semi-diameter passing may be found by subtracting 0s.18 from the Sidereal Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		h. m. s.	s.	° ' "	"	m. s.	s.	h. m. s.
Sun.	1	6 42 35.35	10.332	N.23° 5' 50.0	10.51	3 32.82	0.475	6 39 2.53
Mon.	2	6 46 43.18	10.320	23 1 25.7	11.51	3 44.09	0.463	6 42 59.09
Tues.	3	6 50 50.72	10.307	22 56 37.3	12.51	3 55.07	0.451	6 46 55.65
Wed.	4	6 54 57.97	10.294	22 51 25.0	13.51	4 5.76	0.438	6 50 52.21
Thur.	5	6 59 4.89	10.281	22 45 48.8	14.50	4 16.12	0.424	6 54 48.77
Fri.	6	7 3 11.47	10.267	22 39 48.9	15.48	4 26.14	0.410	6 58 45.33
Sat.	7	7 7 17.72	10.253	22 33 25.5	16.46	4 35.83	0.395	7 2 41.89
Sun.	8	7 11 23.60	10.237	22 26 38.6	17.44	4 45.16	0.380	7 6 38.44
Mon.	9	7 15 29.10	10.221	22 19 28.3	18.41	4 54.10	0.364	7 10 35.00
Tues.	10	7 19 34.21	10.205	22 11 54.8	19.37	5 2.65	0.347	7 14 31.56
Wed.	11	7 23 38.90	10.188	22 3 58.4	20.33	5 10.78	0.329	7 18 28.12
Thur.	12	7 27 43.16	10.170	21 55 39.2	21.27	5 18.48	0.311	7 22 24.68
Fri.	13	7 31 46.98	10.150	21 46 57.4	22.21	5 25.74	0.292	7 26 21.24
Sat.	14	7 35 50.33	10.130	21 37 53.1	23.14	5 32.53	0.273	7 30 17.80
Sun.	15	7 39 53.20	10.110	21 28 26.6	24.06	5 38.85	0.253	7 34 14.35
Mon.	16	7 43 55.58	10.089	21 18 38.1	24.97	5 44.67	0.232	7 38 10.91
Tues.	17	7 47 57.45	10.067	21 8 27.9	25.87	5 49.98	0.210	7 42 7.47
Wed.	18	7 51 58.79	10.044	20 57 56.2	26.76	5 54.76	0.188	7 46 4.03
Thur.	19	7 55 59.60	10.021	20 47 3.2	27.65	5 59.02	0.165	7 50 0.58
Fri.	20	7 59 59.85	9.998	20 35 49.1	28.52	6 2.71	0.142	7 53 57.14
Sat.	21	8 3 59.54	9.975	20 24 14.2	29.38	6 5.84	0.118	7 57 53.70
Sun.	22	8 7 58.65	9.951	20 12 18.9	30.23	6 8.40	0.094	8 1 50.25
Mon.	23	8 11 57.18	9.927	20 0 3.4	31.07	6 10.37	0.070	8 5 46.81
Tues.	24	8 15 55.13	9.902	19 47 27.8	31.89	6 11.76	0.045	8 9 43.37
Wed.	25	8 19 52.46	9.877	19 34 32.5	32.70	6 12.54	0.020	8 13 39.92
Thur.	26	8 23 49.17	9.851	19 21 17.9	33.50	6 12.69	0.006	8 17 36.48
Fri.	27	8 27 45.26	9.825	19 7 44.1	34.30	6 12.22	0.032	8 21 33.04
Sat.	28	8 31 40.74	9.799	18 53 51.5	35.08	6 11.15	0.063	8 25 29.59
Sun.	29	8 35 35.60	9.773	18 39 40.3	35.85	6 9.45	0.083	8 29 26.15
Mon.	30	8 39 29.85	9.747	18 25 10.7	36.61	6 7.14	0.109	8 33 22.71
Tues.	31	8 43 23.49	9.722	18 10 23.0	37.36	6 4.23	0.134	8 37 19.26
Wed.	32	8 47 16.52	9.697	N.17 55 17.5	38.09	6 0.70	0.160	8 41 15.82

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Dif. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	183	99 47 26.2	46 46.5	142.94	—0.14	0.0072091	0.1	h. m. s. 17 18 6.94	
2	184	100 44 36.8	43 56.9	142.94	—0.05	.0072087	0.5	17 14 11.02	
3	185	101 41 47.4	41 7.3	142.94	+0.07	.0072069	1.0	17 10 15.11	
4	186	102 38 57.9	38 17.6	142.94	0.20	.0072037	1.6	17 6 19.20	
5	187	103 36 8.5	35 28.0	142.95	0.33	.0071990	2.2	17 2 23.29	
6	188	104 33 19.3	32 38.6	142.96	0.46	.0071928	2.8	16 58 27.37	
7	189	105 30 30.5	29 49.6	142.98	0.58	.0071851	3.5	16 54 31.45	
8	190	106 27 42.1	27 1.0	143.00	0.68	.0071757	4.2	16 50 35.54	
9	191	107 24 54.2	24 13.0	143.02	0.76	.0071646	5.0	16 46 39.63	
10	192	108 22 6.8	21 25.4	143.04	0.81	.0071516	5.8	16 42 43.72	
11	193	109 19 19.9	18 38.3	143.06	0.83	.0071367	6.7	16 38 47.80	
12	194	110 16 33.6	15 51.8	143.08	0.82	.0071197	7.6	16 34 51.88	
13	195	111 13 47.8	13 5.8	143.10	0.79	.0071005	8.5	16 30 55.97	
14	196	112 11 2.6	10 20.5	143.13	0.71	.0070789	9.5	16 27 0.06	
15	197	113 8 18.0	7 35.7	143.16	0.63	.0070549	10.6	16 23 4.15	
16	198	114 5 34.0	4 51.5	143.19	0.51	.0070283	11.7	16 19 8.24	
17	199	115 2 50.5	2 7.8	143.21	0.38	.0069992	12.8	16 15 12.32	
18	200	115 60 7.6	59 24.8	143.23	0.24	.0069675	13.8	16 11 16.41	
19	201	116 57 25.3	56 42.4	143.25	+0.11	.0069332	14.8	16 7 20.50	
20	202	117 54 43.5	54 0.4	143.27	—0.02	.0068964	15.9	16 3 24.59	
21	203	118 52 2.1	51 18.8	143.28	0.14	.0068571	16.9	15 59 28.68	
22	204	119 49 21.0	48 37.5	143.30	0.23	.0068154	17.9	15 55 32.77	
23	205	120 46 40.3	45 56.6	143.32	0.31	.0067713	18.8	15 51 36.86	
24	206	121 44 0.2	43 16.4	143.34	0.36	.0067250	19.7	15 47 40.95	
25	207	122 41 20.7	40 36.7	143.36	0.38	.0066765	20.5	15 43 45.04	
26	208	123 38 41.7	37 57.5	143.38	0.37	.0066261	21.2	15 39 49.13	
27	209	124 36 3.1	35 18.7	143.40	0.33	.0065738	21.9	15 35 53.22	
28	210	125 33 24.9	32 40.4	143.42	0.25	.0065199	22.6	15 31 57.31	
29	211	126 30 47.2	30 2.6	143.44	0.16	.0064645	23.3	15 28 1.40	
30	212	127 28 10.1	27 25.3	143.47	—0.05	.0064078	23.9	15 24 5.49	
31	213	128 25 33.8	24 48.8	143.51	+0.07	.0063498	24.5	15 20 9.58	
32	214	129 22 58.3	22 13.1	143.55	+0.20	0.0062905	25.0	15 16 13.66	

NOTE.— $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.

## SEMI-DIAMETER.

## HORIZONTAL PARALLAX.

## MERIDIAN PASSAGE.

## AGE.

Noon.

Midnight.

Noon.

Diff. for  
1 hour.

Midnight.

Diff. for  
1 hour.

h. m.

m.

d.

Day of the Month.	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.	h. m.	m.	d.
1	15 32.8	15 28.6	56 56.8	-1.27	56 41.4	-1.29	11 0.1	2.35	12.3
2	15 24.4	15 20.1	56 25.9	1.30	56 10.3	1.29	11 55.5	2.25	13.3
3	15 15.9	15 11.8	55 54.8	1.28	55 39.7	1.24	12 47.8	2.10	14.3
4	15 7.8	15 4.0	55 25.0	1.19	55 11.1	1.12	13 36.4	1.95	15.3
5	15 0.5	14 57.3	54 58.1	1.04	54 46.2	0.93	14 21.5	1.82	16.3
6	14 54.4	14 52.0	54 35.7	0.81	54 26.9	0.66	15 3.8	1.72	17.3
7	14 50.1	14 48.7	54 19.8	0.51	54 14.7	-0.34	15 44.1	1.66	18.3
8	14 47.9	14 47.7	54 11.7	-0.15	54 11.0	+0.04	16 23.7	1.65	19.3
9	14 48.2	14 49.3	54 12.7	+0.25	54 16.9	0.45	17 3.4	1.68	20.3
10	14 51.1	14 53.6	54 23.6	0.67	54 32.9	0.88	17 44.6	1.76	21.3
11	14 56.8	15 0.7	54 44.7	1.08	54 58.9	1.28	18 28.2	1.89	22.3
12	15 5.2	15 10.3	55 15.5	1.47	55 34.3	1.65	19 15.3	2.06	23.3
13	15 16.0	15 22.1	55 55.0	1.80	56 17.5	1.93	20 6.7	2.23	24.3
14	15 28.6	15 35.4	56 41.4	2.03	57 6.2	2.09	21 2.2	2.39	25.3
15	15 42.3	15 49.2	57 31.5	2.12	57 57.0	2.10	22 1.1	2.49	26.3
16	15 56.0	16 2.5	58 21.9	2.04	58 45.8	1.93	23 1.4	2.51	27.3
17	16 8.6	16 14.0	59 8.1	1.77	59 28.3	1.57	0 0.9	2.44	28.3
18	16 18.8	16 22.8	59 45.8	1.34	60 0.3	1.07	0 0.9	2.44	29.3
19	16 25.8	16 27.9	60 11.5	0.78	60 19.1	+0.48	0 58.1	2.32	0.9
20	16 29.0	16 29.1	60 23.1	+0.18	60 23.5	-0.11	1 52.3	2.20	1.9
21	16 28.2	16 26.5	60 20.4	-0.39	60 14.1	0.64	2 44.0	2.12	2.9
22	16 24.0	16 20.8	60 4.9	0.87	59 53.3	1.06	3 34.2	2.08	3.9
23	16 17.1	16 13.0	59 39.6	1.21	59 24.3	1.33	4 24.1	2.09	4.9
24	16 8.5	16 3.7	59 7.7	1.42	58 50.2	1.47	5 14.8	2.14	5.9
25	15 58.8	15 53.8	58 32.3	1.50	58 14.1	1.51	6 7.1	2.22	6.9
26	15 48.9	15 44.0	57 56.0	1.51	57 38.0	1.49	7 1.5	2.30	7.9
27	15 39.2	15 34.5	57 20.3	1.46	57 2.9	1.42	7 57.5	2.35	8.9
28	15 29.9	15 25.5	56 46.1	1.38	56 29.9	1.32	8 53.9	2.33	9.9
29	15 21.2	15 17.1	56 14.3	1.28	55 59.3	1.22	9 49.2	2.26	10.9
30	15 13.2	15 9.5	55 44.9	1.17	55 31.2	1.12	10 41.9	2.13	11.9
31	15 5.9	15 2.6	55 18.1	1.06	55 5.8	0.99	11 31.4	1.99	12.9
32	14 59.5	14 56.6	54 54.3	-0.92	54 43.7	-0.84	12 17.4	1.85	13.9



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 1.					TUESDAY 3.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	17 14 3.51	2,4541	S.26 35 5.7	0,387	0	19 8 15.31	2,3701	S.24 2 6.9	6,464
1	17 16 30.71	2,4525	26 35 24.8	0,389	1	19 10 31.37	2,3648	23 55 35.4	6,564
2	17 18 57.81	2,4509	26 35 34.4	0,061	2	19 12 47.09	2,3592	23 48 56.8	6,708
3	17 21 24.81	2,4492	26 35 34.6	0,076	3	19 15 2.47	2,3535	23 42 11.1	6,821
4	17 23 51.71	2,4478	26 35 25.3	0,333	4	19 17 17.51	2,3478	23 35 18.3	6,937
5	17 26 18.49	2,4454	26 35 6.6	0,390	5	19 19 32.31	2,3431	23 28 18.5	7,063
6	17 28 45.16	2,4434	26 34 36.5	0,446	6	19 21 46.56	2,3364	23 21 11.9	7,167
7	17 31 11.70	2,4412	26 34 1.0	0,702	7	19 24 0.57	2,3306	23 13 58.4	7,261
8	17 33 38.11	2,4389	26 33 14.2	0,866	8	19 26 14.23	2,3248	23 6 38.2	7,363
9	17 36 4.37	2,4365	26 32 18.0	1,013	9	19 28 27.54	2,3190	22 59 11.3	7,504
10	17 38 30.49	2,4340	26 31 12.6	1,167	10	19 30 40.51	2,3132	22 51 37.7	7,614
11	17 40 56.45	2,4313	26 29 58.0	1,331	11	19 32 53.12	2,3073	22 43 57.6	7,732
12	17 43 22.25	2,4288	26 28 34.1	1,478	12	19 35 5.38	2,3016	22 36 11.1	7,839
13	17 45 47.88	2,4267	26 27 1.0	1,626	13	19 37 17.29	2,2956	22 28 18.2	7,936
14	17 48 13.34	2,4237	26 25 18.8	1,780	14	19 39 28.84	2,2897	22 20 18.9	8,040
15	17 50 38.61	2,4197	26 23 27.5	1,931	15	19 41 40.04	2,2838	22 12 13.3	8,144
16	17 53 3.70	2,4166	26 21 27.1	2,082	16	19 43 50.89	2,2779	22 4 1.6	8,246
17	17 55 28.59	2,4133	26 19 17.6	2,233	17	19 46 1.38	2,2719	21 55 43.8	8,347
18	17 57 53.29	2,4099	26 16 59.2	2,382	18	19 48 11.52	2,2659	21 47 19.9	8,447
19	18 0 17.79	2,4065	26 14 31.8	2,531	19	19 50 21.30	2,2600	21 38 50.1	8,546
20	18 2 42.07	2,4030	26 11 55.5	2,679	20	19 52 30.72	2,2541	21 30 14.4	8,644
21	18 5 6.14	2,3993	26 9 10.3	2,827	21	19 54 39.79	2,2482	21 21 32.9	8,740
22	18 7 29.98	2,3955	26 6 10.3	2,974	22	19 56 48.50	2,2423	21 12 45.6	8,836
23	18 9 53.60	2,3917	S.26 3 13.5	3,120	23	19 58 56.86	2,2364	S.21 3 52.6	8,930
MONDAY 2.					WEDNESDAY 4.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	18 12 16.98	2,3878	S.26 0 1.9	3,265	0	20 1 4.87	2,2305	S.20 54 54.0	9,023
1	18 14 40.12	2,3837	25 56 41.7	3,409	1	20 3 12.52	2,2246	20 45 49.9	9,114
2	18 17 3.02	2,3795	25 53 13.8	3,552	2	20 5 19.82	2,2187	20 36 40.3	9,205
3	18 19 25.67	2,3753	25 49 35.4	3,695	3	20 7 26.77	2,2129	20 27 25.3	9,295
4	18 21 48.06	2,3710	25 45 49.4	3,837	4	20 9 33.37	2,2070	20 18 4.9	9,383
5	18 24 10.19	2,3666	25 41 55.0	3,978	5	20 11 39.62	2,2012	20 8 39.3	9,470
6	18 26 32.05	2,3621	25 37 52.1	4,118	6	20 13 45.52	2,0954	19 59 8.5	9,556
7	18 28 53.64	2,3576	25 33 40.9	4,257	7	20 15 51.07	2,0895	19 49 32.6	9,640
8	18 31 14.96	2,3530	25 29 21.3	4,395	8	20 17 56.27	2,0836	19 39 51.7	9,723
9	18 33 35.99	2,3482	25 24 53.4	4,533	9	20 20 1.12	2,0778	19 30 5.8	9,806
10	18 35 56.74	2,3434	25 20 17.4	4,669	10	20 22 5.63	2,0720	19 20 15.0	9,887
11	18 38 17.20	2,3386	25 15 33.2	4,804	11	20 24 9.80	2,0662	19 10 19.3	9,967
12	18 40 37.37	2,3337	25 10 41.0	4,938	12	20 26 13.62	2,0603	19 0 18.9	10,046
13	18 42 57.24	2,3287	25 5 40.7	5,071	13	20 28 17.10	2,0545	18 50 13.8	10,124
14	18 45 16.82	2,3237	25 0 32.5	5,203	14	20 30 20.25	2,0486	18 40 4.0	10,201
15	18 47 36.09	2,3186	24 55 18.4	5,334	15	20 32 23.06	2,0428	18 29 49.7	10,276
16	18 49 55.05	2,3135	24 49 52.4	5,464	16	20 34 25.53	2,0369	18 19 30.9	10,350
17	18 52 13.70	2,3083	24 44 20.7	5,593	17	20 36 27.67	2,0310	18 9 7.6	10,424
18	18 54 32.04	2,3031	24 38 41.3	5,720	18	20 38 29.49	2,0251	17 58 40.0	10,497
19	18 56 50.07	2,2978	24 32 54.3	5,847	19	20 40 30.97	2,0192	17 48 8.1	10,569
20	18 59 7.77	2,2924	24 26 59.7	5,973	20	20 42 32.13	2,0133	17 37 31.9	10,640
21	19 1 25.15	2,2869	24 20 57.6	6,098	21	20 44 32.97	2,0113	17 26 51.6	10,707
22	19 3 42.20	2,2814	24 14 48.0	6,221	22	20 46 33.48	2,0054	17 16 7.1	10,775
23	19 5 58.92	2,2759	24 8 31.1	6,343	23	20 48 33.67	2,0006	17 5 18.6	10,842
24	19 8 15.31	2,2704	S.24 2 6.9	6,464	24	20 50 33.55	1,9933	S.16 54 26.1	10,908



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 5.					SATURDAY 7.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	20 50 33.55	1.9068	S. 16 54 26.1	10.908	0	22 21 15.35	1.9068	S. 7 14 9.8	12.926
1	20 52 33.11	1.9061	16 43 29.7	10.972	1	22 23 3.66	1.9089	7 1 13.7	12.946
2	20 54 32.36	1.9049	16 32 29.5	11.035	2	22 24 51.82	1.9015	6 48 16.3	12.967
3	20 56 31.30	1.9798	16 21 25.5	11.098	3	22 26 39.85	1.7993	6 35 17.7	12.987
4	20 58 29.94	1.9747	16 10 17.8	11.160	4	22 28 27.74	1.7971	6 22 17.9	13.006
5	21 0 28.28	1.9697	15 59 6.4	11.219	5	22 30 15.60	1.7960	6 9 17.0	13.023
6	21 2 26.31	1.9647	15 47 51.5	11.278	6	22 32 3.14	1.7939	5 56 15.1	13.040
7	21 4 24.04	1.9597	15 36 33.1	11.336	7	22 33 50.85	1.7909	5 43 12.1	13.067
8	21 6 21.48	1.9548	15 25 11.2	11.395	8	22 35 38.05	1.7889	5 30 8.2	13.073
9	21 8 18.63	1.9500	15 13 45.9	11.449	9	22 37 25.33	1.7971	5 17 3.3	13.089
10	21 10 15.48	1.9452	15 2 17.3	11.504	10	22 39 12.50	1.7938	5 3 57.5	13.108
11	21 12 12.05	1.9405	14 50 45.4	11.558	11	22 40 59.57	1.7886	4 50 50.9	13.117
12	21 14 8.34	1.9366	14 39 10.3	11.611	12	22 42 46.53	1.7819	4 37 43.4	13.130
13	21 16 4.35	1.9312	14 27 32.0	11.664	13	22 44 33.40	1.7803	4 24 35.2	13.143
14	21 18 0.08	1.9265	14 15 50.6	11.715	14	22 46 20.17	1.7788	4 11 26.2	13.156
15	21 19 55.54	1.9220	14 4 6.2	11.765	15	22 48 6.86	1.7774	3 58 16.5	13.167
16	21 21 50.72	1.9175	13 52 18.8	11.814	16	22 49 53.46	1.7760	3 45 6.1	13.178
17	21 23 45.64	1.9132	13 40 28.4	11.863	17	22 51 39.98	1.7747	3 31 55.1	13.188
18	21 25 40.30	1.9088	13 28 35.2	11.911	18	22 53 26.43	1.7735	3 18 43.5	13.197
19	21 27 34.70	1.9045	13 16 39.1	11.957	19	22 55 12.80	1.7723	3 5 31.4	13.208
20	21 29 28.84	1.9003	13 4 40.3	12.002	20	22 56 59.11	1.7712	2 52 18.8	13.214
21	21 31 22.73	1.8961	12 52 38.8	12.047	21	22 58 45.35	1.7702	2 39 5.7	13.223
22	21 33 16.37	1.8919	12 40 34.6	12.091	22	23 0 31.54	1.7693	2 25 52.2	13.228
23	21 35 9.76	1.8878	S. 12 28 27.8	12.134	23	23 2 17.67	1.7684	S. 2 12 38.3	13.234
FRIDAY 6.					SUNDAY 8.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	21 37 2.91	1.8838	S. 12 16 18.5	12.176	0	23 4 3.75	1.7676	S. 1 59 24.1	13.239
1	21 38 55.82	1.8799	12 4 6.7	12.217	1	23 5 49.78	1.7668	1 46 9.6	13.244
2	21 40 48.60	1.8760	11 51 53.5	12.257	2	23 7 35.77	1.7662	1 32 54.8	13.248
3	21 42 40.94	1.8722	11 39 35.9	12.296	3	23 9 21.73	1.7656	1 19 39.8	13.251
4	21 44 33.16	1.8684	11 27 17.0	12.334	4	23 11 7.65	1.7651	1 6 24.7	13.253
5	21 46 25.15	1.8647	11 14 55.9	12.371	5	23 12 53.54	1.7646	0 53 9.4	13.255
6	21 48 16.92	1.8610	11 2 32.5	12.407	6	23 14 39.41	1.7642	0 39 54.1	13.256
7	21 50 8.47	1.8574	10 50 7.0	12.443	7	23 16 25.25	1.7639	0 26 38.7	13.257
8	21 51 59.81	1.8539	10 37 39.3	12.478	8	23 18 11.08	1.7637	0 13 23.2	13.257
9	21 53 50.94	1.8504	10 25 9.6	12.512	9	23 19 56.89	1.7635	S. 0 0 7.8	13.256
10	21 55 41.86	1.8470	10 12 37.9	12.545	10	23 21 42.70	1.7634	N. 0 13 7.6	13.255
11	21 57 32.58	1.8437	10 0 4.3	12.577	11	23 23 28.50	1.7634	0 26 22.9	13.253
12	21 59 23.10	1.8404	9 47 28.7	12.608	12	23 25 14.31	1.7635	0 39 38.0	13.250
13	22 1 13.42	1.8372	9 34 51.3	12.639	13	23 27 0.12	1.7636	0 52 52.9	13.247
14	22 3 3.56	1.8341	9 22 12.0	12.668	14	23 28 45.94	1.7638	1 6 7.7	13.244
15	22 4 53.51	1.8310	9 9 31.0	12.697	15	23 30 31.77	1.7640	1 19 22.3	13.240
16	22 6 43.28	1.8280	8 56 48.3	12.726	16	23 32 17.62	1.7643	1 32 36.5	13.234
17	22 8 32.87	1.8251	8 44 3.9	12.754	17	23 34 3.49	1.7647	1 45 50.4	13.228
18	22 10 22.29	1.8223	8 31 17.8	12.781	18	23 35 49.39	1.7652	1 59 3.9	13.222
19	22 12 11.53	1.8198	8 18 30.2	12.807	19	23 37 35.32	1.7656	2 12 17.1	13.216
20	22 14 0.61	1.8166	8 5 41.0	12.832	20	23 39 21.29	1.7665	2 25 29.8	13.208
21	22 15 49.53	1.8140	7 52 50.3	12.857	21	23 41 7.30	1.7672	2 28 42.1	13.200
22	22 17 38.29	1.8114	7 39 58.2	12.880	22	23 42 53.35	1.7680	2 51 53.8	13.191
23	22 19 26.90	1.8088	7 27 4.7	12.903	23	23 44 39.45	1.7688	3 5 5.0	13.183
24	22 21 15.35	1.8063	S. 7 14 9.8	12.925	24	23 46 25.61	1.7697	N. 3 18 15.6	13.173



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 9.					WEDNESDAY 11.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	23 46 25.61	1.7697	N. 3 18 15.6	13.173	0	1 13 48.47	1.8990	N. 13 25 59.3	11.874
1	23 48 11.82	1.7707	3 31 25.6	13.161	1	1 15 42.54	1.9084	13 37 50.4	11.836
2	23 49 58.10	1.7718	3 44 34.9	13.149	2	1 17 36.88	1.9079	13 49 38.7	11.781
3	23 51 44.44	1.7729	3 57 43.5	13.137	3	1 19 31.49	1.9125	14 1 24.1	11.733
4	23 53 30.85	1.7741	4 10 51.3	13.124	4	1 21 26.38	1.9171	14 13 6.7	11.684
5	23 55 17.34	1.7764	4 23 58.4	13.111	5	1 23 21.54	1.9217	14 24 46.4	11.635
6	23 57 3.90	1.7767	4 37 4.6	13.097	6	1 25 16.99	1.9264	14 36 23.0	11.585
7	23 58 50.54	1.7781	4 50 9.9	13.082	7	1 27 12.73	1.9313	14 47 56.6	11.533
8	0 0 37.27	1.7796	5 3 14.4	13.067	8	1 29 8.75	1.9362	14 59 27.0	11.481
9	0 2 24.09	1.7811	5 16 17.9	13.051	9	1 31 5.07	1.9411	15 10 54.3	11.428
10	0 4 11.00	1.7827	5 29 20.5	13.034	10	1 33 1.69	1.9461	15 22 18.4	11.374
11	0 5 58.02	1.7845	5 42 22.0	13.017	11	1 34 58.62	1.9513	15 33 39.2	11.319
12	0 7 45.14	1.7863	5 55 22.5	12.999	12	1 36 55.85	1.9565	15 44 56.7	11.263
13	0 9 32.37	1.7881	6 8 21.9	12.980	13	1 38 53.40	1.9617	15 56 10.8	11.206
14	0 11 19.71	1.7900	6 21 20.1	12.961	14	1 40 51.26	1.9670	16 7 21.5	11.148
15	0 13 7.17	1.7921	6 34 17.2	12.941	15	1 42 49.44	1.9723	16 18 28.6	11.089
16	0 14 54.76	1.7943	6 47 13.0	12.920	16	1 44 47.94	1.9777	16 29 32.2	11.029
17	0 16 42.48	1.7964	7 0 7.5	12.898	17	1 46 46.76	1.9832	16 40 32.1	10.968
18	0 18 30.33	1.7986	7 13 0.8	12.876	18	1 48 45.92	1.9888	16 51 28.4	10.906
19	0 20 18.31	1.8009	7 25 52.7	12.854	19	1 50 45.41	1.9944	17 2 21.0	10.844
20	0 22 6.44	1.8033	7 38 43.3	12.831	20	1 52 45.24	2.0000	17 13 9.7	10.780
21	0 23 54.72	1.8068	7 51 32.4	12.807	21	1 54 45.41	2.0067	17 23 54.6	10.715
22	0 25 43.14	1.8093	8 4 20.1	12.782	22	1 56 45.92	2.0114	17 34 35.5	10.649
23	0 27 31.72	1.8109	N. 8 17 6.2	12.756	23	1 58 46.77	2.0173	N. 17 45 19.5	10.582
TUESDAY 10.					THURSDAY 12.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	0 29 20.45	1.8136	N. 8 29 50.8	12.730	0	2 0 47.98	2.0230	N. 17 55 45.4	10.514
1	0 31 9.35	1.8163	8 42 33.8	12.708	1	2 2 49.54	2.0289	18 6 14.2	10.445
2	0 32 58.41	1.8191	8 55 15.2	12.676	2	2 4 51.45	2.0349	18 16 38.9	10.375
3	0 34 47.64	1.8220	9 7 54.9	12.647	3	2 6 53.72	2.0409	18 26 59.1	10.303
4	0 36 37.05	1.8249	9 20 32.8	12.618	4	2 8 56.36	2.0470	18 37 15.1	10.230
5	0 38 26.63	1.8279	9 33 9.0	12.588	5	2 10 59.36	2.0531	18 47 26.7	10.157
6	0 40 16.40	1.8310	9 45 43.3	12.557	6	2 13 2.73	2.0592	18 57 33.9	10.082
7	0 42 6.35	1.8341	9 58 15.8	12.526	7	2 15 6.47	2.0654	19 7 36.5	10.006
8	0 43 56.49	1.8373	10 10 46.4	12.494	8	2 17 10.58	2.0717	19 17 34.6	9.929
9	0 45 46.83	1.8407	10 23 15.0	12.461	9	2 19 15.07	2.0780	19 27 28.0	9.851
10	0 47 37.37	1.8441	10 35 41.7	12.427	10	2 21 19.94	2.0843	19 37 16.7	9.771
11	0 49 28.12	1.8475	10 48 6.3	12.393	11	2 23 25.19	2.0907	19 47 0.5	9.690
12	0 51 19.07	1.8510	11 0 28.8	12.358	12	2 25 30.83	2.0971	19 56 39.5	9.608
13	0 53 10.24	1.8547	11 12 49.2	12.323	13	2 27 36.85	2.1036	20 6 13.6	9.526
14	0 55 1.63	1.8584	11 25 7.4	12.288	14	2 29 43.26	2.1101	20 15 42.6	9.442
15	0 56 53.24	1.8621	11 37 23.4	12.248	15	2 31 50.06	2.1167	20 25 6.5	9.356
16	0 58 45.08	1.8659	11 49 37.1	12.209	16	2 33 57.26	2.1233	20 34 25.3	9.269
17	1 0 37.15	1.8698	12 1 48.5	12.170	17	2 36 4.85	2.1298	20 43 38.8	9.183
18	1 2 29.46	1.8738	12 13 57.5	12.130	18	2 38 12.84	2.1364	20 52 47.1	9.093
19	1 4 22.00	1.8778	12 26 4.1	12.090	19	2 40 21.22	2.1430	21 1 50.0	9.008
20	1 6 14.79	1.8819	12 38 8.3	12.048	20	2 42 30.00	2.1496	21 10 47.5	8.913
21	1 8 7.83	1.8861	12 50 9.9	12.006	21	2 44 39.18	2.1563	21 19 39.5	8.819
22	1 10 1.12	1.8903	13 2 9.0	11.963	22	2 46 48.76	2.1631	21 28 25.8	8.725
23	1 11 54.66	1.8946	13 14 5.5	11.919	23	2 48 58.75	2.1699	21 37 6.4	8.633
24	1 13 48.47	1.8990	N. 13 25 59.3	11.874	24	2 51 9.15	2.1767	N. 21 45 41.3	8.533



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 13.					SUNDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	2 51 9.15	2.1767	N 21 45 41.3	8.638	0	4 43 18.90	2.4822	N 26 19 26.3	2.384
1	2 53 19.96	2.1835	21 54 10.4	8.436	1	4 45 47.98	2.4871	26 21 44.6	2.326
2	2 55 31.17	2.1908	22 2 33.6	8.337	2	4 48 17.35	2.4918	26 23 53.4	2.067
3	2 57 42.79	2.1971	22 10 50.8	8.236	3	4 50 47.00	2.4965	26 25 52.7	1.908
4	2 59 54.82	2.2039	22 19 1.9	8.135	4	4 53 16.93	2.5011	26 27 42.4	1.748
5	3 2 7.96	2.2108	22 27 6.9	8.032	5	4 55 47.13	2.5056	26 29 22.4	1.586
6	3 4 20.12	2.2177	22 35 5.7	7.928	6	4 58 17.60	2.5100	26 30 52.7	1.423
7	3 6 33.39	2.2246	22 42 58.2	7.823	7	5 0 48.32	2.5142	26 32 13.2	1.260
8	3 8 47.08	2.2314	22 50 44.3	7.715	8	5 3 19.30	2.5183	26 33 23.8	1.096
9	3 11 1.18	2.2384	22 58 24.0	7.607	9	5 5 50.52	2.5222	26 34 24.6	0.930
10	3 13 15.69	2.2453	23 5 57.1	7.498	10	5 8 21.08	2.5262	26 35 15.4	0.764
11	3 15 30.61	2.2521	23 13 23.6	7.387	11	5 10 53.66	2.5300	26 35 56.3	0.598
12	3 17 45.94	2.2590	23 20 43.5	7.275	12	5 13 25.57	2.5335	26 36 27.1	0.431
13	3 20 1.68	2.2658	23 27 56.6	7.161	13	5 16 57.69	2.5371	26 36 47.8	0.262
14	3 22 17.84	2.2727	23 35 2.8	7.047	14	5 18 30.02	2.5406	26 36 58.5	0.093
15	3 24 34.41	2.2796	23 42 2.1	6.931	15	5 21 2.55	2.5437	26 36 59.0	0.076
16	3 26 51.39	2.2865	23 48 54.4	6.812	16	5 23 35.26	2.5468	26 36 49.4	0.246
17	3 29 8.78	2.2933	23 55 39.7	6.694	17	5 26 8.16	2.5498	26 36 29.5	0.417
18	3 31 26.58	2.3001	24 2 17.8	6.574	18	5 28 41.23	2.5526	26 35 59.4	0.588
19	3 33 44.78	2.3068	24 8 48.7	6.453	19	5 31 14.47	2.5553	26 35 19.0	0.760
20	3 36 3.39	2.3136	24 15 12.2	6.330	20	5 33 47.87	2.5578	26 34 28.2	0.932
21	3 38 22.41	2.3203	24 21 28.3	6.206	21	5 36 21.41	2.5602	26 33 27.1	1.104
22	3 40 41.83	2.3270	24 27 37.0	6.081	22	5 38 55.10	2.5625	26 32 15.7	1.277
23	3 43 1.65	2.3337	N 24 33 38.1	5.954	23	5 41 28.92	2.5647	N 26 30 53.9	1.451
SATURDAY 14.					MONDAY 16.				
0	3 45 21.87	2.3403	N 24 39 31.5	5.826	0	5 44 2.87	2.5667	N 26 29 21.6	1.625
1	3 47 42.49	2.3469	24 45 17.2	5.697	1	5 46 36.93	2.5686	26 27 38.9	1.799
2	3 50 3.50	2.3535	24 50 55.2	5.567	2	5 49 11.10	2.5703	26 25 45.7	1.973
3	3 52 24.90	2.3600	24 56 25.3	5.435	3	5 51 45.37	2.5719	26 23 42.1	2.148
4	3 54 46.70	2.3665	25 1 47.4	5.302	4	5 54 19.73	2.5734	26 21 27.9	2.324
5	3 57 8.88	2.3729	25 7 1.5	5.168	5	5 56 54.17	2.5747	26 19 3.2	2.500
6	3 59 31.45	2.3793	25 12 7.5	5.032	6	5 59 28.69	2.5760	26 16 27.9	2.675
7	4 1 54.39	2.3856	25 17 5.3	4.896	7	6 2 3.28	2.5769	26 13 42.1	2.851
8	4 4 17.71	2.3918	25 21 54.9	4.757	8	6 4 37.92	2.5778	26 10 45.8	3.027
9	4 6 41.40	2.3980	25 26 36.2	4.617	9	6 7 12.61	2.5785	26 7 38.9	3.203
10	4 9 5.47	2.4041	25 31 9.0	4.476	10	6 9 47.34	2.5791	26 4 21.4	3.379
11	4 11 29.90	2.4102	25 35 33.4	4.335	11	6 12 22.10	2.5796	26 0 53.4	3.555
12	4 13 54.70	2.4162	25 39 49.2	4.192	12	6 14 56.89	2.5799	25 57 14.8	3.731
13	4 16 19.86	2.4222	25 43 56.4	4.047	13	6 17 31.69	2.5800	25 53 25.7	3.907
14	4 18 45.37	2.4281	25 47 54.9	3.901	14	6 20 6.49	2.5800	25 49 26.0	4.083
15	4 21 11.23	2.4338	25 51 44.6	3.755	15	6 22 41.29	2.5799	25 45 15.8	4.258
16	4 23 37.43	2.4395	25 55 25.5	3.607	16	6 25 16.08	2.5796	25 40 55.1	4.433
17	4 26 3.98	2.4452	25 58 57.5	3.459	17	6 27 50.85	2.5792	25 36 23.9	4.607
18	4 28 30.86	2.4507	26 2 20.5	3.308	18	6 30 25.59	2.5787	25 31 42.3	4.782
19	4 30 58.07	2.4562	26 5 34.5	3.157	19	6 33 0.29	2.5780	25 26 50.2	4.956
20	4 33 25.61	2.4616	26 8 39.3	3.006	20	6 35 34.95	2.5773	25 21 47.6	5.130
21	4 35 53.47	2.4669	26 11 35.0	2.851	21	6 38 9.56	2.5762	25 16 34.6	5.303
22	4 38 21.64	2.4721	26 14 21.4	2.696	22	6 40 44.10	2.5751	25 11 11.2	5.476
23	4 40 50.12	2.4773	26 16 58.5	2.541	23	6 43 18.57	2.5739	25 5 37.5	5.648
24	4 43 18.90	2.4822	N 26 19 26.3	2.384	24	6 45 52.97	2.5726	N 24 59 53.4	5.820



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 17.					THURSDAY 19.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	6 45 52.97	2.5726	N.24 59 53.4	8.820	1	8 45 55.39	2.4027	N.17 10 18.9	12.885
2	6 48 27.29	2.5712	24 53 50.0	5.992	2	8 48 19.41	2.3980	17 6 22.4	12.907
3	6 51 1.51	2.5696	24 47 54.3	6.163	3	8 50 43.15	2.3934	16 53 19.3	12.107
4	6 53 35.63	2.5679	24 41 39.4	6.334	4	8 53 6.62	2.3888	16 40 9.6	12.216
5	6 56 9.65	2.5661	24 35 14.2	6.504	5	8 55 29.81	2.3843	16 26 53.4	12.323
6	6 58 43.56	2.5641	24 28 38.8	6.674	6	8 57 52.72	2.3798	16 13 30.9	12.426
7	7 1 17.34	2.5620	24 21 53.3	6.843	7	9 0 15.36	2.3750	16 0 2.1	12.521
8	7 3 51.00	2.5599	24 14 57.7	7.010	8	9 2 37.72	2.3704	15 46 27.2	12.622
9	7 6 24.53	2.5576	24 7 52.1	7.177	9	9 4 59.81	2.3658	15 32 46.3	12.721
10	7 8 57.92	2.5552	24 0 36.4	7.344	10	9 7 21.62	2.3613	15 18 59.5	12.822
11	7 11 31.16	2.5527	23 53 10.8	7.509	11	9 9 43.16	2.3567	15 5 6.8	12.925
12	7 14 4.24	2.5501	23 45 35.3	7.674	12	9 12 4.43	2.3522	14 51 8.4	13.019
13	7 16 37.17	2.5474	23 37 49.9	7.838	13	9 14 25.42	2.3477	14 37 4.5	13.111
14	7 19 9.93	2.5446	23 29 54.7	8.001	14	9 16 46.14	2.3432	14 22 55.1	13.202
15	7 21 42.52	2.5417	23 21 49.8	8.163	15	9 19 6.60	2.3387	14 8 40.3	13.291
16	7 24 14.93	2.5388	23 13 35.2	8.323	16	9 21 26.79	2.3342	13 54 20.3	13.377
17	7 26 47.15	2.5354	23 5 11.1	8.482	17	9 23 46.71	2.3296	13 39 55.1	13.461
18	7 29 19.18	2.5322	22 56 37.4	8.641	18	9 26 6.37	2.3250	13 25 24.9	13.544
19	7 31 51.02	2.5289	22 47 54.2	8.798	19	9 28 25.76	2.3204	13 10 49.8	13.625
20	7 34 22.65	2.5255	22 39 01.7	8.953	20	9 30 44.89	2.3157	12 56 9.8	13.705
21	7 36 54.08	2.5220	22 30 59.8	9.108	21	9 33 3.77	2.3112	12 41 25.2	13.782
22	7 39 25.29	2.5184	22 20 48.6	9.262	22	9 35 22.39	2.3067	12 26 36.0	13.857
23	7 41 56.29	2.5148	22 11 28.3	9.415	23	9 37 40.76	2.3020	12 11 42.3	13.931
	7 44 27.07	2.5111	N.22 1 56.8	9.567	24	9 39 58.88	2.2975	N.11 56 44.2	14.005
WEDNESDAY 18.					FRIDAY 20.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	7 46 57.69	2.5078	N.21 52 20.3	9.717	1	9 42 16.75	2.2930	N.11 41 41.9	14.073
2	7 49 27.94	2.5034	21 42 32.8	9.868	2	9 44 34.38	2.2918	11 26 35.4	14.142
3	7 51 58.03	2.4996	21 32 36.4	10.014	3	9 46 51.77	2.2878	11 11 24.9	14.208
4	7 54 27.89	2.4957	21 22 31.2	10.160	4	9 49 8.92	2.2839	10 56 10.5	14.273
5	7 56 57.51	2.4917	21 12 17.2	10.305	5	9 51 25.84	2.2800	10 40 52.2	14.336
6	7 59 26.89	2.4876	21 1 54.6	10.449	6	9 53 42.53	2.2762	10 25 30.2	14.397
7	8 1 56.03	2.4833	20 51 23.4	10.591	7	9 55 58.98	2.2724	10 10 4.6	14.456
8	8 4 24.90	2.4788	20 40 43.7	10.732	8	9 58 15.21	2.2687	9 54 35.5	14.513
9	8 6 53.53	2.4751	20 29 55.6	10.871	9	10 0 31.22	2.2650	9 39 3.0	14.569
10	8 9 21.91	2.4709	20 18 59.2	11.009	10	10 2 47.01	2.2614	9 23 27.2	14.622
11	8 11 50.03	2.4666	20 7 54.5	11.145	11	10 5 2.59	2.2578	9 7 48.3	14.673
12	8 14 17.89	2.4622	19 56 41.7	11.280	12	10 7 17.95	2.2543	8 52 6.4	14.722
13	8 16 45.49	2.4578	19 45 20.9	11.413	13	10 9 33.11	2.2508	8 36 21.5	14.771
14	8 19 12.82	2.4533	19 33 52.1	11.545	14	10 11 48.06	2.2473	8 20 33.8	14.817
15	8 21 39.88	2.4488	19 22 15.5	11.675	15	10 14 2.81	2.2437	8 4 43.4	14.862
16	8 24 6.67	2.4443	19 10 31.1	11.804	16	10 16 17.36	2.2400	7 48 50.4	14.905
17	8 26 33.19	2.4398	18 58 39.0	11.931	17	10 18 31.72	2.2364	7 32 54.8	14.946
18	8 28 59.44	2.4352	18 46 39.4	12.056	18	10 20 45.89	2.2327	7 16 56.9	14.984
19	8 31 25.41	2.4306	18 34 32.3	12.179	19	10 22 59.88	2.2291	7 0 56.7	15.021
20	8 33 51.10	2.4259	18 22 17.9	12.301	20	10 25 13.69	2.2255	6 44 54.3	15.057
21	8 36 16.52	2.4213	18 9 56.2	12.421	21	10 27 27.31	2.2217	6 28 49.9	15.091
22	8 38 41.66	2.4166	17 57 27.4	12.540	22	10 29 40.76	2.2180	6 12 43.5	15.122
23	8 41 6.51	2.4120	17 44 51.5	12.657	23	10 31 54.04	2.2142	5 56 35.3	15.152
24	8 43 31.09	2.4073	17 32 8.6	12.772	24	10 34 7.15	2.2104	5 40 25.3	15.180
	8 45 55.39	2.4027	N.17 19 18.9	12.885		10 36 20.10	2.2146	N. 5 24 13.7	15.206



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 21.					MONDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	10 36 30.10	2.3146	N. 5 24 13.7	16.306	0	12 21 1.19	2.1766	S. 7 31 54.1	15.514
1	10 38 32.89	2.3119	5 8 0.6	16.321	1	12 23 11.82	2.1777	7 47 23.4	15.462
2	10 40 45.53	2.3096	4 51 46.0	16.354	2	12 25 22.51	2.1793	8 2 49.5	15.408
3	10 42 58.03	2.3071	4 35 30.1	16.375	3	12 27 33.27	2.1799	8 18 12.4	15.363
4	10 45 10.38	2.3047	4 19 13.0	16.394	4	12 29 44.10	2.1811	8 33 31.9	15.326
5	10 47 22.59	2.3024	4 2 54.8	16.312	5	12 31 55.01	2.1835	8 48 48.0	15.288
6	10 49 34.67	2.3006	3 46 35.6	16.336	6	12 34 6.00	2.1869	9 4 0.5	15.179
7	10 51 46.62	2.1989	3 30 15.5	16.342	7	12 36 17.08	2.1886	9 19 9.5	15.119
8	10 53 58.45	2.1961	3 13 54.6	16.354	8	12 38 28.24	2.1898	9 34 14.8	15.067
9	10 56 10.15	2.1941	2 57 33.0	16.365	9	12 40 39.50	2.1894	9 49 16.3	14.993
10	10 58 21.74	2.1923	2 41 10.8	16.374	10	12 42 50.85	2.1901	10 4 14.0	14.928
11	11 0 33.92	2.1904	2 24 48.1	16.381	11	12 45 2.31	2.1916	10 19 7.8	14.862
12	11 2 44.59	2.1886	2 8 25.1	16.386	12	12 47 13.87	2.1936	10 33 57.5	14.794
13	11 4 55.85	2.1869	1 52 1.8	16.390	13	12 49 25.54	2.1954	10 48 43.1	14.726
14	11 7 7.02	2.1853	1 35 38.3	16.392	14	12 51 37.32	2.1973	11 3 24.6	14.656
15	11 9 18.10	2.1838	1 19 14.7	16.398	15	12 53 49.21	2.1992	11 18 1.8	14.588
16	11 11 29.08	2.1824	1 2 51.1	16.392	16	12 56 1.22	2.2012	11 32 34.6	14.510
17	11 13 39.98	2.1810	0 46 27.6	16.389	17	12 58 13.35	2.2033	11 47 3.0	14.436
18	11 15 50.80	2.1797	0 30 4.4	16.384	18	13 0 25.61	2.2054	12 1 26.9	14.360
19	11 18 1.54	2.1784	N. 0 13 41.5	16.378	19	13 2 38.00	2.2076	12 15 46.1	14.282
20	11 20 12.21	2.1772	S. 0 2 41.0	16.370	20	13 4 50.52	2.2098	12 30 0.7	14.208
21	11 22 22.81	2.1762	0 19 3.0	16.361	21	13 7 3.17	2.2121	12 44 10.5	14.128
22	11 24 33.36	2.1753	0 35 24.4	16.340	22	13 9 15.97	2.2144	12 58 15.5	14.041
23	11 26 43.85	2.1744	S. 0 51 45.0	16.326	23	13 11 28.91	2.2168	S. 13 12 15.5	13.956
SUNDAY 22.					TUESDAY 24.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	11 28 54.29	2.1736	S. 1 8 4.8	16.323	0	13 13 41.99	2.2192	S. 13 26 10.6	13.876
1	11 31 4.66	2.1728	1 24 23.7	16.307	1	13 15 55.92	2.2217	13 40 0.6	13.791
2	11 33 15.03	2.1721	1 40 41.6	16.290	2	13 18 8.60	2.2242	13 53 45.5	13.705
3	11 35 25.34	2.1715	1 56 58.4	16.271	3	13 20 22.13	2.2268	14 7 25.2	13.616
4	11 37 35.61	2.1710	2 13 14.0	16.250	4	13 22 35.82	2.2294	14 20 59.6	13.530
5	11 39 45.86	2.1706	2 29 28.4	16.228	5	13 24 49.66	2.2320	14 34 28.7	13.440
6	11 41 56.08	2.1702	2 45 41.4	16.204	6	13 27 3.66	2.2347	14 47 52.3	13.349
7	11 44 6.28	2.1699	3 1 52.9	16.179	7	13 29 17.83	2.2374	15 1 10.5	13.257
8	11 46 16.47	2.1697	3 18 2.9	16.152	8	13 31 32.16	2.2403	15 14 23.1	13.163
9	11 48 26.65	2.1696	3 34 11.2	16.124	9	13 33 46.66	2.2430	15 27 30.1	13.068
10	11 50 36.82	2.1695	3 50 17.8	16.094	10	13 36 1.32	2.2458	15 40 31.3	12.972
11	11 52 46.99	2.1695	4 6 22.5	16.062	11	13 38 16.16	2.2487	15 53 26.7	12.874
12	11 54 57.17	2.1697	4 22 25.3	16.029	12	13 40 31.17	2.2516	16 6 16.2	12.776
13	11 57 7.35	2.1698	4 38 26.1	15.995	13	13 42 46.36	2.2546	16 18 59.8	12.676
14	11 59 17.55	2.1700	4 54 24.7	15.969	14	13 45 1.72	2.2576	16 31 37.3	12.575
15	12 1 27.76	2.1704	5 10 21.1	15.921	15	13 47 17.96	2.2606	16 44 8.7	12.473
16	12 3 38.00	2.1709	5 26 15.2	15.892	16	13 49 32.99	2.2636	16 56 34.0	12.369
17	12 5 48.27	2.1713	5 42 6.9	15.841	17	13 51 48.90	2.2667	17 8 53.0	12.264
18	12 7 58.56	2.1718	5 57 56.1	15.789	18	13 54 5.00	2.2698	17 21 5.7	12.168
19	12 10 8.89	2.1724	6 13 42.7	15.735	19	13 56 21.28	2.2729	17 33 12.0	12.081
20	12 12 19.25	2.1731	6 29 26.7	15.710	20	13 58 37.75	2.2760	17 45 11.8	11.943
21	12 14 29.66	2.1739	6 45 7.9	15.683	21	14 0 54.41	2.2792	17 57 5.1	11.833
22	12 16 40.12	2.1747	7 0 46.3	15.616	22	14 3 11.26	2.2823	18 8 51.8	11.722
23	12 18 50.63	2.1756	7 16 21.7	15.549	23	14 5 28.30	2.2855	18 20 31.8	11.611
24	12 21 1.19	2.1766	S. 7 31 54.1	15.514	24	14 7 45.52	2.2887	S. 18 32 5.1	11.499



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 25.					FRIDAY 27.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	14 7 45.52	2.3887	S.18 32 5.1	11.489	0	16 1 3.55	2.4180	S.25 15 50.0	4.009
1	14 10 2.94	2.3919	18 43 31.6	11.385	1	16 3 28.68	2.4194	25 20 46.0	4.957
2	14 12 20.55	2.3951	18 54 51.3	11.370	2	16 5 53.88	2.4207	25 25 32.9	4.705
3	14 14 38.35	2.3983	19 6 4.0	11.154	3	16 8 19.16	2.4219	25 30 10.7	4.553
4	14 16 56.35	2.3916	19 17 9.8	11.087	4	16 10 44.51	2.4230	25 34 39.3	4.401
5	14 19 14.54	2.3947	19 28 8.5	10.990	5	16 13 9.92	2.4241	25 38 58.8	4.348
6	14 21 32.02	2.3979	19 39 0.2	10.802	6	16 15 35.40	2.4251	25 43 9.1	4.095
7	14 23 51.49	2.3112	19 49 44.7	10.692	7	16 18 0.93	2.4269	25 47 10.2	3.941
8	14 26 10.26	2.3144	20 0 22.0	10.561	8	16 20 26.51	2.4287	25 51 9.1	3.789
9	14 28 29.22	2.3176	20 10 52.0	10.439	9	16 22 52.13	2.4274	25 54 44.8	3.634
10	14 30 48.37	2.3208	20 21 14.7	10.316	10	16 25 17.80	2.4280	25 58 18.2	3.480
11	14 33 7.71	2.3240	20 31 30.0	10.192	11	16 27 43.60	2.4285	26 1 42.4	3.326
12	14 35 27.25	2.3272	20 41 37.8	10.067	12	16 30 9.21	2.4290	26 4 57.3	3.171
13	14 37 46.98	2.3304	20 51 38.0	9.941	13	16 32 34.95	2.4292	26 8 2.9	3.016
14	14 40 6.90	2.3336	21 1 30.7	9.814	14	16 35 0.71	2.4294	26 10 59.2	2.861
15	14 42 27.01	2.3367	21 11 15.7	9.686	15	16 37 26.48	2.4295	26 13 46.2	2.706
16	14 44 47.31	2.3398	21 20 53.0	9.557	16	16 39 52.25	2.4296	26 16 23.9	2.550
17	14 47 7.79	2.3429	21 30 22.5	9.426	17	16 42 18.02	2.4294	26 18 52.2	2.394
18	14 49 28.46	2.3460	21 39 44.1	9.294	18	16 44 43.78	2.4292	26 21 11.2	2.238
19	14 51 49.31	2.3491	21 48 57.8	9.162	19	16 47 9.52	2.4290	26 23 20.8	2.082
20	14 54 10.35	2.3522	21 58 3.5	9.029	20	16 49 35.25	2.4285	26 25 21.1	1.926
21	14 56 31.57	2.3552	22 7 1.2	8.894	21	16 52 0.95	2.4281	26 27 12.1	1.771
22	14 58 52.97	2.3582	22 15 50.8	8.759	22	16 54 26.62	2.4275	26 28 53.7	1.616
23	15 1 14.55	2.3611	S.22 24 32.3	8.624	23	16 56 52.25	2.4269	S.26 30 26.0	1.461
THURSDAY 26.					SATURDAY 28.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	15 3 36.30	2.3640	S.22 33 5.7	8.488	0	16 59 17.83	2.4260	S.26 31 49.0	1.306
1	15 5 58.22	2.3669	22 41 30.9	8.351	1	17 1 43.36	2.4251	26 33 2.7	1.152
2	15 8 20.32	2.3697	22 49 47.8	8.213	2	17 4 8.84	2.4241	26 34 7.2	0.997
3	15 10 42.59	2.3726	22 57 56.5	8.075	3	17 6 34.25	2.4229	26 35 2.4	0.843
4	15 13 5.02	2.3753	23 5 56.8	7.936	4	17 8 59.59	2.4217	26 35 48.3	0.689
5	15 15 27.61	2.3780	23 13 48.8	7.797	5	17 11 24.86	2.4204	26 36 25.0	0.535
6	15 17 50.37	2.3806	23 21 32.4	7.657	6	17 13 50.04	2.4190	26 36 52.5	0.382
7	15 20 13.28	2.3832	23 29 7.5	7.515	7	17 16 15.13	2.4174	26 37 10.8	0.229
8	15 22 36.35	2.3858	23 36 34.2	7.373	8	17 18 40.13	2.4156	26 37 20.0	0.076
9	15 24 59.57	2.3883	23 43 52.3	7.231	9	17 21 5.03	2.4141	26 37 20.0	0.077
10	15 27 22.94	2.3907	23 51 1.9	7.089	10	17 23 29.82	2.4123	26 37 10.8	0.230
11	15 29 46.45	2.3930	23 58 2.8	6.943	11	17 25 54.50	2.4104	26 36 52.5	0.382
12	15 32 10.10	2.3953	24 4 55.0	6.798	12	17 28 19.07	2.4084	26 36 25.0	0.534
13	15 34 33.89	2.3976	24 11 38.5	6.652	13	17 30 43.51	2.4063	26 35 48.4	0.685
14	15 36 57.81	2.3998	24 18 13.2	6.505	14	17 33 7.82	2.4041	26 35 2.8	0.836
15	15 39 21.86	2.4020	24 24 39.1	6.358	15	17 35 31.99	2.4017	26 34 8.1	0.987
16	15 41 46.05	2.4041	24 30 56.2	6.210	16	17 37 56.02	2.3999	26 33 4.4	1.137
17	15 44 10.36	2.4061	24 37 4.4	6.062	17	17 40 19.90	2.3987	26 31 51.7	1.287
18	15 46 34.78	2.4080	24 43 3.6	5.913	18	17 42 43.62	2.3964	26 30 30.0	1.436
19	15 48 59.32	2.4098	24 48 53.9	5.763	19	17 45 7.19	2.3944	26 28 59.4	1.585
20	15 51 23.96	2.4116	24 54 35.2	5.613	20	17 47 30.59	2.3926	26 27 19.8	1.733
21	15 53 48.71	2.4133	25 0 7.5	5.462	21	17 49 53.82	2.3907	26 25 31.4	1.881
22	15 56 13.50	2.4149	25 5 30.7	5.311	22	17 52 16.87	2.3887	26 23 34.1	2.029
23	15 58 38.51	2.4165	25 10 44.9	5.160	23	17 54 39.74	2.3796	26 21 28.0	2.174
24	16 1 3.55	2.4180	S.25 15 50.0	5.009	24	17 57 2.43	2.3764	S.26 19 13.2	2.320



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 29.					TUESDAY 31.				
0	17 57 2.43	2.3764	S. 26 19 13.2	2.320	0	19 46 9.19	2.1517	S. 21 55 42.8	8.298
1	17 59 24.92	2.3782	26 16 49.6	2.466	1	19 48 18.12	2.1462	21 47 22.2	8.392
2	18 1 47.22	2.3800	26 14 17.4	2.609	2	19 50 26.73	2.1407	21 38 55.7	8.490
3	18 4 9.31	2.3866	26 11 36.6	2.762	3	19 52 35.01	2.1352	21 30 23.3	8.588
4	18 6 31.20	2.3930	26 8 47.2	2.896	4	19 54 43.95	2.1297	21 21 45.1	8.684
5	18 8 52.87	2.3994	26 5 49.2	3.037	5	19 56 50.57	2.1242	21 13 1.2	8.778
6	18 11 14.33	2.4057	26 2 42.8	3.178	6	19 58 57.96	2.1188	21 4 11.7	8.872
7	18 13 35.56	2.4120	25 59 27.9	3.318	7	20 1 4.83	2.1134	20 55 16.6	8.966
8	18 15 56.57	2.4182	25 56 4.6	3.456	8	20 3 11.47	2.1079	20 46 15.9	9.056
9	18 18 17.34	2.4243	25 52 33.0	3.597	9	20 5 17.78	2.1025	20 37 9.8	9.146
10	18 20 37.88	2.4303	25 48 53.0	3.735	10	20 7 23.77	2.0971	20 27 58.4	9.235
11	18 22 58.18	2.4363	25 45 4.8	3.873	11	20 9 29.43	2.0917	20 18 41.0	9.324
12	18 25 18.23	2.4422	25 41 8.3	4.010	12	20 11 34.77	2.0863	20 9 19.5	9.412
13	18 27 38.03	2.4479	25 37 3.6	4.146	13	20 13 39.78	2.0809	19 59 52.2	9.498
14	18 29 57.58	2.4536	25 32 50.8	4.281	14	20 15 44.47	2.0755	19 50 19.8	9.583
15	18 32 16.87	2.4592	25 28 29.9	4.415	15	20 17 48.84	2.0702	19 40 42.3	9.667
16	18 34 35.90	2.4648	25 24 1.0	4.548	16	20 19 52.89	2.0648	19 30 59.8	9.750
17	18 36 54.66	2.4705	25 19 24.1	4.681	17	20 21 56.62	2.0595	19 21 12.3	9.832
18	18 39 13.16	2.4760	25 14 39.2	4.813	18	20 24 0.03	2.0541	19 11 20.0	9.913
19	18 41 31.38	2.4814	25 9 46.5	4.943	19	20 26 3.12	2.0488	19 1 22.8	9.992
20	18 43 49.33	2.4868	25 4 46.0	5.073	20	20 28 5.89	2.0435	18 51 20.9	10.070
21	18 46 7.00	2.4921	24 59 37.7	5.202	21	20 30 8.35	2.0383	18 41 14.3	10.148
22	18 48 24.38	2.4974	24 54 21.7	5.330	22	20 32 10.49	2.0331	18 31 3.1	10.224
23	18 50 41.48	2.5026	S. 24 48 58.0	5.456	23	20 34 12.32	2.0280	S. 18 20 47.4	10.299
MONDAY 30.					WEDNESDAY, AUGUST 1.				
0	18 52 58.29	2.5077	S. 24 43 26.7	5.584	0	20 36 13.85	2.0229	S. 18 10 27.2	10.373
1	18 55 14.81	2.5138	24 37 47.9	5.709	PHASES OF THE MOON.  ☉ Full Moon, . . . 2 16 7.0 ☾ Last Quarter, . . . 10 17 58.1 ● New Moon, . . . 18 2 20.3 ☽ First Quarter, . . . 24 18 19.7				
2	18 57 31.03	2.5199	24 32 1.6	5.833					
3	18 59 46.96	2.5259	24 26 8.0	5.955					
4	19 2 2.58	2.5319	24 20 7.0	6.076					
5	19 4 17.90	2.5378	24 13 58.7	6.197	Day. h. m.  ☾ Apogee, . . . . . 6 9.5 ☾ Perigee, . . . . . 20 7.2				
6	19 6 32.92	2.5437	24 7 43.3	6.317					
7	19 8 47.63	2.5496	24 1 20.7	6.435					
8	19 11 2.04	2.5555	23 54 51.1	6.552					
9	19 13 16.13	2.5613	23 48 14.4	6.669					
10	19 15 29.91	2.5671	23 41 30.8	6.785					
11	19 17 43.38	2.5728	23 34 40.2	6.900					
12	19 19 56.53	2.5785	23 27 49.8	7.014					
13	19 22 9.36	2.5842	23 20 38.6	7.128					
14	19 24 21.88	2.5899	23 13 27.7	7.241					
15	19 26 34.07	2.5956	23 6 10.1	7.354					
16	19 28 45.94	2.6012	22 58 46.0	7.466					
17	19 30 57.49	2.6068	22 51 15.3	7.578					
18	19 33 8.71	2.6124	22 43 38.1	7.689					
19	19 35 19.61	2.6179	22 35 54.5	7.799					
20	19 37 30.18	2.6234	22 28 4.6	7.908					
21	19 39 40.42	2.6289	22 20 8.4	8.016					
22	19 41 50.34	2.6343	22 12 6.0	8.123					
23	19 43 59.93	2.6397	22 3 57.4	8.229					
24	19 46 9.19	2.6451	S. 21 55 42.8	8.334					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
1	Spica W.	57 45 56	2620	59 24 24	2629	61 2 39	2636	62 40 43	2647
	Antares W.	11 54 47	2619	13 33 25	2621	15 11 51	2631	16 50 4	2640
	Mars E.	39 8 47	2606	37 29 45	2607	35 51 0	2620	34 12 32	2633
	$\alpha$ Aquilæ E.	50 39 2	2763	49 16 21	2631	48 1 51	2606	46 48 36	2666
	Fomalhaut E.	72 6 46	3069	70 37 22	3068	69 8 21	3077	67 39 43	3067
	$\alpha$ Pegasi E.	92 53 35	2770	91 18 28	2779	89 43 33	2788	88 8 50	2798
2	Spica W.	70 47 53	2684	72 24 41	2704	74 1 16	2713	75 37 38	2723
	Antares W.	24 58 2	2687	26 34 59	2697	28 11 43	2707	29 48 14	2717
	Mars E.	26 5 14	2718	24 28 58	2740	22 53 11	2764	21 17 56	2793
	Fomalhaut E.	60 23 7	3216	58 57 16	3243	57 31 58	3274	56 7 16	3306
	$\alpha$ Pegasi E.	80 18 33	2651	78 45 11	2663	77 12 5	2675	75 39 14	2687
	$\alpha$ Arietis E.	122 53 4	2707	121 16 34	2716	119 40 16	2726	118 4 11	2735
3	Spica W.	83 36 11	2776	85 11 13	2785	86 46 3	2794	88 20 39	2808
	Antares W.	37 47 30	2767	39 22 41	2777	40 57 39	2787	42 32 24	2797
	Fomalhaut E.	49 13 45	3000	47 53 21	3048	46 33 50	3069	45 15 15	3086
	$\alpha$ Pegasi E.	67 59 3	2964	66 27 53	2980	64 57 1	2984	63 26 28	3000
	$\alpha$ Arietis E.	110 6 52	2784	108 32 3	2793	106 57 26	2808	105 23 2	2813
4	Spica W.	96 10 27	2823	97 43 46	2864	99 16 51	2873	100 49 44	2883
	Antares W.	50 22 52	2847	51 56 19	2867	53 29 33	2886	55 2 35	2876
	Fomalhaut E.	38 58 59	4022	37 47 41	4118	36 37 57	4223	35 29 53	4243
	$\alpha$ Pegasi E.	55 58 49	3069	54 30 22	3105	53 2 19	3125	51 34 40	3147
	$\alpha$ Arietis E.	97 34 12	2823	96 1 4	2872	94 28 9	2892	92 55 27	2892
5	Spica W.	108 31 7	2880	110 2 48	2889	111 34 17	2947	113 5 36	2957
	Antares W.	62 44 41	2923	64 16 31	2932	65 48 9	2940	67 19 37	2949
	Mars W.	13 43 26	3189	15 10 47	3092	16 39 6	3080	18 8 5	3037
	$\alpha$ Pegasi E.	44 23 9	3269	42 58 21	3290	41 34 8	3331	40 10 31	3365
	$\alpha$ Arietis E.	85 14 54	3068	83 43 23	2947	89 12 3	2966	80 40 55	2965
	Aldebaran E.	117 22 48	3011	115 52 37	3009	114 22 35	3016	112 52 42	3022
6	Antares W.	74 54 19	2969	76 24 46	2996	77 55 4	3002	79 25 14	3009
	Mars W.	25 37 46	2968	27 8 4	2984	28 38 24	2994	30 8 44	2993
	$\alpha$ Arietis E.	73 7 50	3005	71 37 43	3019	70 7 45	3019	68 37 56	3036
	Aldebaran E.	105 25 21	3066	103 56 18	3022	102 27 22	3069	100 58 34	3074
7	Antares W.	86 54 4	3089	88 23 29	3043	89 52 49	3047	91 22 3	3062
	$\alpha$ Aquilæ W.	42 13 39	4650	43 15 21	4680	44 18 20	4686	45 22 25	4416
	Mars W.	37 40 25	2997	39 10 41	3000	40 40 54	3001	42 11 6	3003
	$\alpha$ Arietis E.	61 10 57	3068	59 41 56	3064	58 13 1	3066	56 44 13	3074
	Aldebaran E.	93 36 19	3101	92 8 11	3105	90 40 9	3111	89 12 13	3116
	SUN E.	130 57 25	3402	129 35 11	3406	128 13 3	3411	126 50 59	3416
8	Antares W.	98 47 5	3067	100 15 55	3069	101 44 43	3069	103 13 30	3070
	$\alpha$ Aquilæ W.	50 56 49	4149	52 6 4	4108	53 15 58	4070	54 26 29	4086
	Mars W.	49 41 40	3008	51 11 43	3006	52 41 46	3008	54 11 49	3007
	$\alpha$ Arietis E.	49 21 31	3092	47 53 12	3096	46 24 57	3099	44 56 45	3101
	Aldebaran E.	81 53 39	3131	80 26 7	3133	78 58 38	3135	77 31 11	3138
	SUN E.	120 1 48	3431	118 40 7	3434	117 18 29	3436	115 56 52	3436
9	Antares W.	110 37 17	3069	112 6 4	3067	113 34 54	3065	115 3 46	3063
	Mars W.	61 42 21	3001	63 12 33	2997	64 42 49	2996	66 13 8	2992
	$\alpha$ Aquilæ W.	60 27 3	3890	61 40 34	3864	62 54 30	3841	64 8 50	3819



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
1	Spica W.	64 18 34	2666	65 56 13	2666	67 33 39	2676	69 10 52	2684
	Antares W.	18 28 5	2649	20 5 53	2638	21 43 29	2668	23 20 52	2678
	Mars E.	32 34 22	2649	30 56 33	2663	29 19 4	2679	27 41 56	2696
	α Aquilæ E.	45 36 41	4073	44 26 13	4169	43 17 18	4276	42 10 2	4390
	Fomalhaut E.	66 11 30	3118	64 43 42	3140	63 16 21	3164	61 49 29	3189
	α Pegasi E.	86 34 20	2808	85 0 3	2818	83 25 59	2829	81 52 9	2840
2	Spica W.	77 13 47	2788	78 49 43	2744	80 25 25	2758	82 0 55	2763
	Antares W.	31 24 32	2797	33 0 36	2737	34 36 27	2747	36 12 5	2756
	Mars E.	19 43 19	2898	18 9 27	2898	16 36 27	2919	15 4 32	2985
	Fomalhaut E.	54 43 11	3389	53 19 44	3375	51 56 59	3414	50 34 59	3455
	α Pegasi E.	74 6 38	2900	72 34 19	2913	71 2 17	2926	69 30 31	2940
	α Arietis E.	116 28 18	2745	114 52 38	2764	113 17 10	2764	111 41 55	2778
3	Spica W.	89 55 3	2814	91 29 13	2834	93 3 11	2834	94 36 55	2844
	Antares W.	44 6 56	2806	45 41 14	2818	47 15 20	2828	48 49 12	2837
	Fomalhaut E.	43 57 40	3716	42 41 10	3788	41 25 50	3855	40 11 44	3934
	α Pegasi E.	61 56 15	3016	60 26 22	3082	58 56 49	3050	57 27 38	3088
	α Arietis E.	103 48 50	2823	102 14 52	2832	100 41 6	2842	99 7 33	2852
4	Spica W.	102 22 25	2892	103 54 54	2902	105 27 10	2919	106 59 14	2920
	Antares W.	56 35 25	2896	58 8 2	2896	59 40 27	2906	61 12 40	2914
	Fomalhaut E.	34 23 40	4475	33 19 26	4534	32 17 21	4592	31 17 39	4698
	α Pegasi E.	50 7 27	3168	48 40 39	3191	47 14 19	3216	45 48 29	3242
	α Arietis E.	91 22 56	2801	89 50 38	2910	88 18 31	2920	86 46 37	2928
5	Spica W.	114 36 43	2965	116 7 39	2973	117 38 25	2981	119 9 1	2990
	Antares W.	68 50 54	2968	70 22 0	2966	71 52 56	2973	73 23 43	2981
	Mars W.	19 37 32	3020	21 7 20	3009	22 37 21	3002	24 7 31	2998
	α Pegasi E.	38 47 32	3400	37 25 16	3440	36 3 45	3486	34 43 4	3532
	α Arietis E.	79 9 57	2973	77 39 10	2981	76 8 33	2989	74 38 7	2997
	Aldebaran E.	111 22 57	3030	109 53 21	3086	108 23 53	3043	106 54 33	3049
6	Antares W.	80 55 15	3016	82 25 8	3022	83 54 54	3028	85 24 32	3033
	Mars W.	31 39 5	2998	33 9 26	2993	34 39 47	2994	36 10 7	2996
	α Arietis E.	67 8 16	3033	65 38 44	3040	64 9 21	3046	62 40 5	3052
	Aldebaran E.	99 29 53	3081	98 1 20	3086	96 32 53	3091	95 4 33	3096
7	Antares W.	92 51 12	3085	94 20 16	3080	95 49 16	3082	97 18 12	3085
	α Aquilæ W.	46 27 32	4263	47 33 36	4296	48 40 32	4344	49 48 17	4394
	Mars W.	43 41 16	3004	45 11 24	3005	46 41 31	3006	48 11 36	3007
	α Arietis E.	55 15 30	3078	53 46 53	3082	52 18 21	3086	50 49 54	3089
	Aldebaran E.	87 44 21	3119	86 16 34	3123	84 48 52	3126	83 21 14	3129
	SUN E.	125 29 1	3420	124 7 7	3423	122 45 17	3427	121 23 31	3430
8	Antares W.	104 42 16	3071	106 11 1	3071	107 39 46	3071	109 8 31	3070
	α Aquilæ W.	55 37 33	4003	56 49 10	3970	58 1 19	3941	59 13 57	3914
	Mars W.	55 41 53	3006	57 11 58	3005	58 42 4	3006	60 12 11	3002
	α Arietis E.	43 28 37	3108	42 0 31	3106	40 32 28	3106	39 4 26	3109
	Aldebaran E.	76 3 47	3139	74 36 24	3140	73 9 3	3141	71 41 43	3141
	SUN E.	114 35 16	3436	113 13 40	3436	111 52 5	3436	110 30 29	3435
9	Antares W.	116 32 49	3080	118 1 41	3066	119 30 45	3092	120 59 54	3047
	Mars W.	67 43 31	2998	69 13 59	2984	70 44 32	2980	72 15 10	2974
	α Aquilæ W.	65 23 33	3798	66 38 37	3778	67 54 2	3759	69 9 47	3740



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of DIST.	IIIh.	P. L. of DIST.	VIh.	P. L. of DIST.	IXh.	P. L. of DIST.
		° ' "		° ' "		° ' "		° ' "	
9	Fomalhaut W.	36 15 41	4368	37 21 36	4276	38 28 52	4197	39 37 23	4125
	α Arietis E.	37 36 27	3110	36 8 20	3111	34 40 33	3112	33 19 38	3114
	Aldebaran E.	70 14 23	3141	68 47 3	3141	67 19 43	3140	65 52 22	3139
	SUN E.	109 8 52	3434	107 47 14	3431	106 25 33	3430	105 3 50	3426
10	Mars W.	73 45 55	3909	75 16 47	3903	76 47 46	3909	78 18 53	3906
	α Aquilæ W.	70 25 52	3723	71 42 15	3708	72 58 56	3690	74 15 54	3673
	Fomalhaut W.	45 35 27	3845	46 49 43	3802	48 4 43	3761	49 20 27	3723
	α Arietis E.	25 53 32	3124	24 25 51	3129	22 58 16	3135	21 30 49	3143
	Aldebaran E.	58 35 15	3131	57 7 43	3129	55 40 8	3126	54 12 30	3123
	SUN E.	98 14 12	3404	96 52 0	3399	95 29 42	3395	94 7 17	3385
11	Mars W.	85 56 45	3911	87 28 50	3901	89 1 7	3891	90 33 37	3883
	α Aquilæ W.	80 44 55	3599	82 3 30	3596	83 22 20	3573	84 41 24	3559
	Fomalhaut W.	55 48 35	3569	57 7 55	3529	58 27 46	3509	59 48 7	3476
	α Pegasi W.	32 58 35	3550	34 48 4	3499	35 38 29	3452	36 59 47	3409
	Aldebaran E.	46 53 26	3110	45 25 29	3106	43 57 27	3103	42 29 21	3101
	SUN E.	87 12 55	3343	85 49 32	3332	84 25 58	3322	83 2 12	3311
12	Mars W.	98 19 27	3926	99 53 21	3914	101 27 31	3901	103 1 57	3789
	α Aquilæ W.	91 20 15	3499	92 40 40	3488	94 1 18	3473	95 22 7	3468
	Fomalhaut W.	66 36 59	3356	68 0 6	3334	69 23 38	3312	70 47 36	3280
	α Pegasi W.	43 57 27	3233	45 22 57	3204	46 49 2	3175	48 15 41	3148
	Aldebaran E.	35 8 38	3105	33 40 34	3110	32 12 36	3116	30 44 46	3126
	SUN E.	76 0 2	3260	74 34 52	3236	73 9 26	3222	71 43 43	3208
13	Mars W.	110 58 26	3930	112 34 39	3706	114 11 11	3693	115 48 2	3677
	α Aquilæ W.	102 8 51	3425	103 30 40	3418	104 52 36	3413	106 14 38	3406
	Fomalhaut W.	77 53 32	3189	79 19 54	3170	80 46 39	3151	82 13 47	3133
	α Pegasi W.	55 36 53	3023	57 6 37	3000	58 36 50	2977	60 7 32	2964
	SUN E.	64 30 45	3181	63 3 13	3114	61 35 21	3098	60 7 9	3082
14	α Aquilæ W.	113 5 51	3400	114 26 8	3402	115 50 22	3407	117 12 31	3413
	Fomalhaut W.	89 34 53	3045	91 4 10	3029	92 33 47	3012	94 3 44	2998
	α Pegasi W.	67 47 59	2847	69 21 26	2827	70 55 19	2806	72 29 39	2786
	α Arietis W.	24 18 5	2745	25 53 44	2720	27 29 57	2696	29 6 42	2672
	SUN E.	52 40 55	2994	51 10 35	2976	49 39 52	2956	48 8 46	2934
15	Fomalhaut W.	101 38 0	2930	103 9 41	2919	104 41 38	2908	106 13 45	2899
	α Pegasi W.	80 27 48	2690	82 4 41	2672	83 41 59	2655	85 19 41	2637
	α Arietis W.	37 18 1	2567	38 57 41	2547	40 37 49	2528	42 18 23	2509
	SUN E.	40 27 30	2848	38 54 4	2830	37 20 15	2811	35 46 2	2794
20	SUN W.	26 4 51	2396	27 48 31	2396	29 32 11	2396	31 15 51	2396
	Spica E.	57 56 34	2116	56 5 59	2116	54 15 24	2117	52 24 51	2119
	Antares E.	103 41 28	2107	101 50 39	2107	99 59 49	2107	98 9 1	2108
21	SUN W.	39 53 30	2412	41 36 48	2417	43 19 59	2422	45 3 3	2426
	Spica E.	43 13 3	2186	41 22 59	2141	39 33 3	2147	37 43 15	2156
	Antares E.	88 55 40	2122	87 5 14	2126	85 14 54	2131	83 24 42	2136
	Mars E.	134 25 44	3072	132 34 1	3076				
22	SUN W.	53 36 15	2461	55 18 23	2469	57 0 20	2477	58 42 6	2486
	Spica E.	28 37 13	2198	26 48 42	2210	25 0 29	2224	23 12 37	2237
	Antares E.	74 15 49	2198	72 26 33	2175	70 37 28	2162	68 48 34	2191



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
		<sup>o</sup> <sup>i</sup> <sup>"</sup>		<sup>o</sup> <sup>i</sup> <sup>"</sup>		<sup>o</sup> <sup>i</sup> <sup>"</sup>		<sup>o</sup> <sup>i</sup> <sup>"</sup>	
9	Fomalhaut W.	40 47 1	3099	41 57 43	3099	43 9 24	3094	44 22 0	3093
	α Arietis E.	31 44 45	3114	30 16 53	3116	28 49 3	3119	27 21 16	3121
	Aldebaran E.	64 25 0	3138	62 57 37	3137	61 30 12	3138	60 2 45	3133
	SUN E.	103 42 3	3438	102 20 12	3419	100 58 17	3418	99 36 17	3410
10	Mars W.	79 50 8	2948	81 21 32	2938	82 53 6	2927	84 24 50	2919
	α Aquilæ W.	75 33 10	3056	76 50 42	3043	78 8 31	3028	79 26 35	3013
	Fomalhaut W.	50 36 51	3096	51 53 54	3091	53 11 33	3019	54 29 47	3007
	α Arietis E.	20 3 31	3184	18 36 27	3171	17 9 43	3193	15 43 24	3227
	Aldebaran E.	52 44 48	3120	51 17 3	3117	49 49 14	3114	48 21 22	3111
	SUN E.	92 44 43	3378	91 22 1	3369	89 59 9	3360	88 36 7	3351
11	Mars W.	92 6 19	2973	93 39 15	2961	95 12 24	2949	96 45 48	2938
	α Aquilæ W.	86 0 43	3046	87 20 16	3034	88 40 3	3023	90 0 2	3010
	Fomalhaut W.	61 8 58	3461	62 30 17	3436	63 52 4	3404	65 14 18	3379
	α Pegasi W.	38 21 53	3369	39 44 45	3352	41 8 20	3297	42 32 35	3265
	Aldebaran E.	41 1 13	3100	39 33 3	3101	38 4 53	3101	36 36 45	3104
	SUN E.	81 38 13	3300	80 14 1	3288	78 49 36	3276	77 24 56	3264
12	Mars W.	104 36 39	2775	106 11 39	2763	107 46 57	2749	109 22 32	2735
	α Aquilæ W.	96 43 7	3468	98 4 18	3448	99 25 40	3439	100 47 11	3422
	Fomalhaut W.	72 11 59	3270	73 36 46	3248	75 1 58	3229	76 27 33	3209
	α Pegasi W.	49 41 53	3131	51 10 37	3096	52 38 52	3071	54 7 37	3046
	Aldebaran E.	29 17 8	3189	27 49 46	3167	26 22 45	3179	24 56 11	3206
	SUN E.	70 17 43	3198	68 51 26	3178	67 24 51	3168	65 57 57	3148
13	Mars W.	117 25 13	2692	119 2 44	2646	120 40 36	2632	122 18 48	2617
	α Aquilæ W.	107 36 46	3408	108 58 59	3400	110 21 15	3399	111 43 33	3399
	Fomalhaut W.	83 41 17	3114	85 9 9	3097	86 37 22	3079	88 5 57	3062
	α Pegasi W.	61 38 42	2982	63 10 20	2910	64 42 26	2889	66 14 59	2868
	SUN E.	58 38 37	3055	57 9 44	3047	55 40 29	3030	54 19 53	3012
14	α Aquilæ W.	118 34 33	3421	119 56 26	3422	121 18 6	3446	122 39 30	3463
	Fomalhaut W.	95 33 59	2968	97 4 33	2968	98 35 26	2955	100 6 35	2942
	α Pegasi W.	74 4 25	2766	75 39 37	2747	77 15 15	2727	78 51 19	2708
	α Arietis W.	30 43 59	2650	32 21 46	2629	34 0 2	2607	35 38 47	2586
	SUN E.	46 37 17	2929	45 5 25	2908	43 33 10	2886	42 0 32	2866
15	Fomalhaut W.	107 46 5	2891	109 18 38	2883	110 51 18	2879	112 24 2	2874
	α Pegasi W.	86 57 46	2920	88 36 14	2902	90 15 6	2885	91 54 21	2870
	α Arietis W.	43 59 24	2490	45 40 51	2472	47 22 43	2454	49 5 1	2442
	SUN E.	34 11 26	2775	32 36 26	2756	31 1 3	2740	29 25 16	2728
20	SUN W.	32 59 29	2899	34 43 5	2401	36 26 38	2406	38 10 6	2408
	Spica E.	50 34 21	2121	48 43 54	2134	46 53 31	2128	45 3 14	2123
	Antares E.	96 18 14	2100	94 27 30	2112	92 36 49	2115	90 46 12	2118
21	SUN W.	46 46 0	2433	48 28 48	2439	50 11 27	2446	51 53 56	2453
	Spica E.	35 53 39	2162	34 4 14	2169	32 15 0	2178	30 26 0	2187
	Antares E.	81 34 37	2141	79 44 41	2147	77 54 54	2153	76 5 16	2161
	Mars E.	126 59 34	2090	125 8 20	2086	123 17 14	2109	121 26 17	2107
22	SUN W.	60 23 39	2495	62 4 59	2504	63 46 6	2515	65 26 59	2524
	Spica E.	21 25 5	2263	19 37 57	2273	17 51 18	2296	16 5 13	2296
	Antares E.	66 59 53	2200	65 11 25	2208	63 23 10	2217	61 35 8	2227



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
22	Mars E.	119° 35' 29"	2113	117° 44' 50"	2130	115° 54' 21"	2137	114° 4' 3"	2134
23	Sun W.	67 7 39	2636	68 48 4	2645	70 28 15	2656	72 8 11	2666
	Antares E.	59 47 20	2636	57 59 46	2646	56 12 27	2656	54 25 23	2666
	Mars E.	104 55 25	2176	103 6 22	2184	101 17 31	2194	99 28 54	2204
	α Aquilæ E.	111 30 52	2636	109 59 17	2629	108 27 35	2625	106 55 48	2623
24	Sun W.	80 24 7	2622	82 2 32	2634	83 40 41	2646	85 18 34	2657
	Antares E.	45 33 46	2619	43 48 14	2629	42 2 57	2640	40 17 56	2651
	Mars E.	90 29 39	2356	88 42 35	2366	86 55 46	2379	85 9 15	2390
	α Aquilæ E.	99 16 42	2631	97 45 3	2638	96 13 32	2644	94 42 9	2652
25	Sun W.	93 24 0	2717	95 0 17	2739	96 36 19	2741	98 12 5	2752
	Spica W.	14 31 54	2408	16 13 3	2497	17 54 21	2492	19 35 45	2494
	Antares E.	31 36 50	2406	29 53 24	2417	28 10 14	2429	26 27 20	2439
	Mars E.	76 20 38	2346	74 35 45	2356	72 51 7	2368	71 6 46	2379
	α Aquilæ E.	87 8 10	2606	85 38 5	2621	84 8 18	2635	82 38 49	2651
	Fomalhaut E.	111 47 41	2651	110 14 19	2652	108 40 59	2654	107 7 41	2657
26	Sun W.	106 7 3	2611	107 41 17	2623	109 15 15	2634	110 48 59	2645
	Spica W.	28 1 29	2622	29 42 11	2630	31 22 42	2638	33 3 2	2647
	Mars E.	62 29 8	2437	60 46 26	2448	59 4 0	2460	57 21 51	2472
	α Aquilæ E.	75 16 38	3146	73 49 23	3167	72 22 34	3169	70 56 13	3214
	Fomalhaut E.	99 22 35	2665	97 49 57	2695	96 17 29	2901	94 45 11	2910
	α Pegasi E.	121 33 14	2710	119 56 48	2714	118 20 27	2718	116 44 11	2722
27	Sun W.	118 33 59	2901	120 6 16	2912	121 38 19	2924	123 10 8	2934
	Spica W.	41 21 38	2608	43 0 43	2601	44 39 36	2611	46 18 16	2620
	Mars E.	48 55 11	2681	47 14 41	2643	45 34 28	2656	43 54 32	2667
	α Aquilæ E.	63 52 13	3368	62 29 9	3392	61 6 45	3429	59 45 1	3468
	Fomalhaut E.	87 6 43	2902	85 35 42	2978	84 4 55	2965	82 34 24	2995
	α Pegasi E.	108 44 36	2763	107 9 6	2760	105 33 46	2767	103 58 35	2775
28	Spica W.	54 28 30	2698	56 5 55	2675	57 43 9	2654	59 20 10	2638
	Mars E.	35 39 12	2685	34 1 4	2649	32 23 16	2654	30 45 49	2651
	α Aquilæ E.	53 8 3	3708	51 51 19	3762	50 35 37	3824	49 20 58	3890
	Fomalhaut E.	75 6 2	3071	73 37 17	3087	72 8 52	3106	70 40 48	3132
	α Pegasi E.	96 5 13	2616	94 31 6	2625	92 57 10	2633	91 23 25	2642
29	Spica W.	67 22 17	2788	68 58 7	2746	70 33 46	2764	72 9 14	2763
	Antares W.	21 31 58	2780	23 7 58	2786	24 43 47	2747	26 19 24	2756
	Fomalhaut E.	63 26 13	3225	62 0 34	3248	60 35 22	3275	59 10 41	3300
	α Pegasi E.	83 37 41	2690	82 5 9	2900	80 32 50	2910	79 0 44	2921
30	Spica W.	80 3 46	2806	81 38 7	2813	83 12 18	2821	84 46 18	2829
	Antares W.	34 14 41	2796	35 49 11	2807	37 23 30	2815	38 57 39	2822
	Fomalhaut E.	52 15 30	3490	50 54 21	3499	49 33 54	3540	48 14 14	3585
	α Pegasi E.	71 23 39	2977	69 52 57	2988	68 22 29	3002	66 52 17	3014
	α Arietis E.	113 39 11	2815	112 5 3	2823	110 31 5	2831	108 57 17	2839
31	Spica W.	92 33 44	2969	94 6 43	2977	95 39 31	2984	97 12 10	2992
	Antares W.	46 45 47	2962	48 18 54	2970	49 51 51	2978	51 24 38	2986
	α Pegasi E.	59 25 19	3092	57 56 47	3097	56 28 34	3112	55 0 40	3126
	α Arietis E.	101 10 51	2977	99 38 3	2986	98 5 25	2993	96 32 57	2990



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
22	Mars	E.	112° 13' 56"	2141	110° 24' 0"	2140	108° 34' 16"	2137	106° 44' 44"	2166
23	SUN	W.	73 47 53	2577	75 27 19	2585	77 6 31	2590	78 45 27	2611
	Antares	E.	52 38 33	2276	50 51 58	2287	49 5 39	2297	47 19 35	2307
	Mars	E.	97 40 32	2214	95 52 26	2224	94 4 34	2235	92 16 59	2245
	α Aquilæ	E.	105 23 58	2223	103 52 7	2223	102 20 16	2224	100 48 27	2227
24	SUN	W.	86 56 11	2583	88 33 32	2581	90 10 37	2583	91 47 26	2704
	Antares	E.	38 33 11	2242	36 48 42	2273	35 4 29	2264	33 20 32	2295
	Mars	E.	83 22 59	2200	81 37 0	2211	79 51 17	2222	78 5 49	2233
	α Aquilæ	E.	93 10 56	2242	91 39 55	2272	90 9 6	2262	88 38 31	2263
25	SUN	W.	99 47 36	2764	101 22 51	2776	102 57 50	2788	104 32 34	2799
	Spica	W.	21 17 6	2497	22 58 24	2502	24 39 34	2506	26 20 36	2516
	Antares	E.	24 44 41	2450	23 2 18	2462	21 20 11	2473	19 38 19	2484
	Mars	E.	69 22 41	2291	67 38 54	2402	65 55 22	2414	64 12 7	2425
	α Aquilæ	E.	81 9 39	2063	79 40 50	2065	78 12 23	2104	76 44 18	2124
	Fomalhaut	E.	105 34 27	2262	104 1 19	2265	102 28 17	2273	100 55 22	2276
26	SUN	W.	112 22 28	2587	113 55 42	2586	115 28 42	2579	117 1 28	2591
	Spica	W.	34 43 10	2556	36 23 6	2565	38 2 49	2574	39 42 20	2583
	Mars	E.	55 39 58	2484	53 58 22	2496	52 17 2	2508	50 35 59	2519
	α Aquilæ	E.	69 30 20	2340	68 4 58	2365	66 40 9	2366	65 15 53	2377
	Fomalhaut	E.	93 13 5	2219	91 41 10	2229	90 9 28	2259	88 37 59	2260
	α Pegasi	E.	115 8 1	2726	113 31 58	2734	111 56 3	2759	110 20 15	2746
27	SUN	W.	124 41 44	2945	126 13 6	2955	127 44 15	2965	129 15 11	2976
	Spica	W.	47 56 44	2629	49 34 59	2638	51 13 2	2648	52 50 52	2657
	Mars	E.	42 14 52	2560	40 35 30	2568	38 56 25	2597	37 17 40	2591
	α Aquilæ	E.	58 24 1	2508	57 3 46	2462	55 44 19	2466	54 25 44	2469
	Fomalhaut	E.	81 4 9	2012	79 34 11	2026	78 4 30	2040	76 35 7	2055
	α Pegasi	E.	102 23 34	2722	100 48 43	2720	99 14 2	2759	97 39 32	2707
28	Spica	W.	60 56 59	2702	62 33 36	2711	64 10 1	2719	65 46 15	2729
	Mars	E.	29 8 43	2599	27 32 2	2719	25 55 47	2729	24 19 59	2730
	α Aquilæ	E.	48 7 28	2563	46 55 12	4041	45 44 13	4137	44 34 37	4219
	Fomalhaut	E.	69 13 6	2141	67 45 46	2161	66 18 50	2162	64 52 19	2203
	α Pegasi	E.	89 49 52	2262	88 16 31	2261	86 43 22	2270	85 10 25	2280
29	Spica	W.	73 44 31	2772	75 19 36	2780	76 54 30	2788	78 29 14	2797
	Antares	W.	27 54 50	2764	29 30 5	2773	31 5 8	2782	32 40 0	2790
	Fomalhaut	E.	57 46 30	2226	56 22 51	2236	54 59 47	2290	53 37 19	2424
	α Pegasi	E.	77 28 52	2261	75 57 13	2242	74 25 47	2264	72 54 36	2265
30	Spica	W.	86 20 8	2827	87 53 48	2845	89 27 17	2853	91 0 36	2862
	Antares	W.	40 31 37	2281	42 5 25	2288	43 39 3	2297	45 12 30	2305
	Fomalhaut	E.	46 55 23	2222	45 37 23	2265	44 20 20	2742	43 4 17	2802
	α Pegasi	E.	65 22 21	2026	63 52 40	2039	62 23 16	2053	60 54 9	2067
	α Arietis	E.	107 23 40	2247	105 50 13	2265	104 16 56	2282	102 43 48	2270
31	Spica	W.	98 44 39	2900	100 16 58	2907	101 49 8	2915	103 21 8	2922
	Antares	W.	52 57 15	2288	54 29 43	2291	56 2 1	2298	57 34 10	2296
	α Pegasi	E.	53 33 7	2148	52 5 55	2166	50 39 5	2165	49 12 38	2205
	α Arietis	E.	95 0 38	2208	93 28 29	2215	91 56 29	2222	90 24 39	2230



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to		Diff. for 1 hour.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.		Semi-diameter.	subtracted from Apparent Time.	
		h. m. s.	s.		° ' "	"					
Wed.	1	8 47	17.49	9.697	N. 17 55	13.7	38.09	15 48.17	66.62	6 0.68	0.160
Thur.	2	8 51	9.90	9.672	17 39	50.8	38.82	15 48.30	66.53	5 56.55	0.185
Fri.	3	8 55	1.71	9.647	17 24	10.5	39.54	15 48.43	66.44	5 51.82	0.210
Sat.	4	8 58	52.92	9.622	17 8	13.2	40.23	15 48.57	66.35	5 46.49	0.234
Sun.	5	9 2	43.54	9.598	16 51	59.2	40.92	15 48.71	66.26	5 40.57	0.259
Mon.	6	9 6	33.57	9.574	16 35	28.7	41.61	15 48.85	66.17	5 34.07	0.283
Tues.	7	9 10	23.03	9.550	16 18	42.0	42.27	15 49.00	66.09	5 26.98	0.307
Wed.	8	9 14	11.92	9.526	16 1	39.4	42.93	15 49.15	66.00	5 19.33	0.330
Thur.	9	9 18	0.25	9.503	15 44	21.2	43.57	15 49.30	65.92	5 11.12	0.353
Fri.	10	9 21	48.02	9.480	15 26	47.8	44.20	15 49.46	65.84	5 2.36	0.376
Sat.	11	9 25	35.23	9.457	15 8	59.6	44.81	15 49.62	65.76	4 53.05	0.399
Sun.	12	9 29	21.89	9.435	14 50	56.9	45.42	15 49.79	65.68	4 43.19	0.421
Mon.	13	9 33	8.02	9.413	14 32	39.7	46.01	15 49.96	65.60	4 32.79	0.444
Tues.	14	9 36	53.62	9.391	14 14	8.4	46.59	15 50.13	65.52	4 21.86	0.466
Wed.	15	9 40	38.70	9.369	13 55	23.4	47.15	15 50.31	65.44	4 10.42	0.488
Thur.	16	9 44	23.27	9.347	13 36	25.2	47.70	15 50.49	65.36	3 58.46	0.509
Fri.	17	9 48	7.32	9.325	13 17	14.1	48.23	15 50.68	65.29	3 45.98	0.531
Sat.	18	9 51	50.85	9.304	12 57	50.1	48.76	15 50.87	65.22	3 32.99	0.552
Sun.	19	9 55	33.86	9.284	12 38	13.8	49.26	15 51.07	65.15	3 19.49	0.573
Mon.	20	9 59	16.38	9.264	12 18	25.7	49.75	15 51.27	65.08	3 5.49	0.593
Tues.	21	10 2	58.41	9.244	11 58	26.0	50.23	15 51.47	65.01	2 51.01	0.613
Wed.	22	10 6	39.98	9.224	11 38	15.0	50.70	15 51.68	64.94	2 36.07	0.632
Thur.	23	10 10	21.09	9.205	11 17	52.9	51.15	15 51.89	64.88	2 20.67	0.651
Fri.	24	10 14	1.76	9.187	10 57	20.2	51.59	15 52.10	64.82	2 4.83	0.669
Sat.	25	10 17	42.00	9.170	10 36	37.2	52.01	15 52.32	64.76	1 48.56	0.686
Sun.	26	10 21	21.83	9.153	10 15	44.3	52.42	15 52.54	64.70	1 31.87	0.703
Mon.	27	10 25	1.24	9.136	9 54	41.8	52.81	15 52.77	64.64	1 14.78	0.719
Tues.	28	10 28	40.28	9.121	9 33	29.8	53.20	15 53.00	64.59	0 57.31	0.735
Wed.	29	10 32	18.96	9.107	9 12	8.7	53.57	15 53.23	64.54	0 39.47	0.750
Thur.	30	10 35	57.28	9.093	8 50	38.9	53.93	15 53.46	64.49	0 21.29	0.764
Fri.	31	10 39	35.28	9.079	8 29	0.5	54.27	15 53.69	64.44	0 2.79	0.777
Sat.	32	10 43	12.97	9.066	N. 8 7	14.0	54.61	15 53.92	64.40	0 16.01	0.790

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Equation of Time, to be subtracted from	Diff. for 1 hour.	Sidereal Time.			
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour.	added to Mean Time.					
		h.	m.	s.	s.	°	'	"	"	m.			s.	s.	
Wed.	1	8	47	16.52	9.697	N. 17	55	17.5	38.09	6	0.70	0.160	8	41	15.82
Thur.	2	8	51	8.95	9.672	17	39	54.6	38.82	5	56.57	0.185	8	45	12.38
Fri.	3	8	55	0.77	9.647	17	24	14.3	39.54	5	51.84	0.210	8	49	8.93
Sat.	4	8	58	52.00	9.622	17	8	17.0	40.28	5	46.51	0.234	8	53	5.49
Sun.	5	9	2	42.64	9.598	16	52	3.0	40.92	5	40.59	0.259	8	57	2.05
Mon.	6	9	6	32.69	9.574	16	35	32.5	41.61	5	34.09	0.283	9	0	58.60
Tues.	7	9	10	22.17	9.550	16	18	45.8	42.27	5	27.01	0.307	9	4	55.16
Wed.	8	9	14	11.08	9.526	16	1	43.2	42.98	5	19.36	0.330	9	8	51.72
Thur.	9	9	17	59.43	9.503	15	44	25.0	43.57	5	11.16	0.353	9	12	48.27
Fri.	10	9	21	47.22	9.480	15	26	51.6	44.20	5	2.39	0.376	9	16	44.83
Sat.	11	9	25	34.46	9.457	15	9	3.3	44.81	4	53.08	0.399	9	20	41.38
Sun.	12	9	29	21.15	9.435	14	51	0.5	45.42	4	43.21	0.421	9	24	37.94
Mon.	13	9	33	7.31	9.413	14	32	43.2	46.01	4	32.82	0.444	9	28	34.49
Tues.	14	9	36	52.94	9.391	14	14	11.8	46.59	4	21.89	0.466	9	32	31.05
Wed.	15	9	40	38.05	9.369	13	55	26.7	47.15	4	10.45	0.488	9	36	27.60
Thur.	16	9	44	22.65	9.347	13	36	28.4	47.70	3	58.49	0.509	9	40	24.16
Fri.	17	9	48	6.73	9.325	13	17	17.1	48.23	3	46.02	0.531	9	44	20.71
Sat.	18	9	51	50.29	9.304	12	57	53.0	48.76	3	33.02	0.552	9	48	17.27
Sun.	19	9	55	33.34	9.284	12	38	16.6	49.26	3	19.52	0.573	9	52	13.82
Mon.	20	9	59	15.90	9.264	12	18	28.3	49.75	3	5.52	0.593	9	56	10.38
Tues.	21	10	2	57.97	9.244	11	58	28.4	50.23	2	51.04	0.613	10	0	6.93
Wed.	22	10	6	39.58	9.224	11	38	17.2	50.70	2	36.09	0.632	10	4	3.49
Thur.	23	10	10	20.73	9.203	11	17	54.9	51.15	2	20.69	0.651	10	8	0.04
Fri.	24	10	14	1.44	9.187	10	57	22.0	51.59	2	4.84	0.669	10	11	56.60
Sat.	25	10	17	41.72	9.170	10	36	38.8	52.01	1	48.57	0.686	10	15	53.15
Sun.	26	10	21	21.59	9.153	10	15	45.7	52.42	1	31.88	0.703	10	19	49.71
Mon.	27	10	25	1.05	9.136	9	54	42.9	52.81	1	14.79	0.719	10	23	46.26
Tues.	28	10	28	40.13	9.121	9	33	30.6	53.20	0	57.32	0.735	10	27	42.81
Wed.	29	10	32	18.85	9.107	9	12	9.3	53.57	0	39.48	0.750	10	31	39.37
Thur.	30	10	35	57.22	9.093	8	50	39.2	53.93	0	21.29	0.764	10	35	35.93
Fri.	31	10	39	35.27	9.079	8	29	0.5	54.27	0	2.79	0.777	10	39	32.48
Sat.	32	10	43	13.01	9.066	N. 8	7	13.7	54.61	0	16.02	0.790	10	43	29.03

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Ob.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	214	129° 22' 58.3	22° 13.1	143.55	+0.20	0.0062905	25.0	15 h. 16 m. 13.66 s.	
2	215	130 20 23.8	19 38.5	143.59	0.33	.0062299	25.5	15 12 17.75	
3	216	131 17 50.3	17 4.9	143.63	0.46	.0061682	26.0	15 8 21.84	
4	217	132 15 17.9	14 32.3	143.68	0.56	.0061052	26.5	15 4 25.93	
5	218	133 12 46.8	12 1.0	143.73	0.65	.0060409	27.0	15 0 30.02	
6	219	134 10 16.9	9 31.0	143.78	0.72	.0059754	27.5	14 56 34.11	
7	220	135 7 48.2	7 2.2	143.83	0.75	.0059086	28.1	14 52 38.20	
8	221	136 5 20.8	4 34.7	143.89	0.75	.0058404	28.8	14 48 42.29	
9	222	137 2 54.8	2 8.5	143.96	0.72	.0057706	29.5	14 44 46.38	
10	223	137 60 30.3	59 43.8	144.02	0.65	.0056990	30.2	14 40 50.47	
11	224	138 58 7.3	57 20.7	144.08	0.55	.0056256	31.0	14 36 54.56	
12	225	139 55 45.8	54 59.1	144.14	0.44	.0055503	31.8	14 32 58.65	
13	226	140 53 25.7	52 38.9	144.20	0.32	.0054730	32.6	14 29 2.74	
14	227	141 51 7.2	50 20.2	144.26	0.19	.0053937	33.5	14 25 6.83	
15	228	142 48 50.1	48 3.0	144.32	+0.06	.0053123	34.3	14 21 10.92	
16	229	143 46 34.4	45 47.2	144.38	-0.07	.0052287	35.2	14 17 15.02	
17	230	144 44 20.1	43 32.8	144.44	0.20	.0051481	36.1	14 13 19.11	
18	231	145 42 7.1	41 19.7	144.49	0.30	.0050554	36.9	14 9 23.20	
19	232	146 39 55.4	39 7.8	144.55	0.38	.0049656	37.7	14 5 27.29	
20	233	147 37 45.0	36 57.2	144.60	0.44	.0048738	38.5	14 1 31.38	
21	234	148 35 35.9	34 48.0	144.65	0.46	.0047801	39.3	13 57 35.47	
22	235	149 33 28.0	32 40.0	144.70	0.46	.0046846	40.0	13 53 39.56	
23	236	150 31 21.3	30 33.2	144.75	0.43	.0045875	40.7	13 49 43.65	
24	237	151 29 15.8	28 27.5	144.80	0.36	.0044890	41.3	13 45 47.74	
25	238	152 27 11.6	26 23.2	144.85	0.27	.0043892	41.8	13 41 51.83	
26	239	153 25 8.7	24 20.2	144.90	0.16	.0042882	42.2	13 37 55.93	
27	240	154 23 7.1	22 18.5	144.96	-0.04	.0041862	42.6	13 34 0.02	
28	241	155 21 6.9	20 18.2	145.02	+0.09	.0040834	42.9	13 30 4.11	
29	242	156 19 8.1	18 19.2	145.08	0.22	.0039798	43.1	13 26 8.20	
30	243	157 17 10.8	16 21.8	145.15	0.35	.0038757	43.4	13 22 12.29	
31	244	158 15 15.2	14 26.1	145.22	0.47	.0037709	43.6	13 18 16.39	
32	245	159 13 21.3	12 32.1	145.29	+0.56	0.0036655	43.9	13 14 20.48	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 60.



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.	h. m.	m.	
1	14 59.5	14 56.6	54 54.3	−0.92	54 43.7	−0.84	12 17.4	1.85	13.9
2	14 54.0	14 51.6	54 34.1	0.76	54 25.5	0.67	13 0.6	1.75	14.9
3	14 49.6	14 47.9	54 18.1	0.56	54 12.0	0.44	13 41.5	1.68	15.9
4	14 46.7	14 45.9	54 7.4	0.32	54 4.4	−0.18	14 21.3	1.65	16.9
5	14 45.5	14 45.7	54 3.2	−0.02	54 3.9	+0.14	15 0.8	1.66	17.9
6	14 46.5	14 47.8	54 6.6	+0.32	54 11.6	0.51	15 41.0	1.71	18.9
7	14 49.8	14 52.4	54 18.8	0.70	54 28.4	0.90	16 23.1	1.81	19.9
8	14 55.7	14 59.6	54 40.4	1.10	54 54.7	1.30	17 8.0	1.94	20.9
9	15 4.1	15 9.3	55 11.5	1.49	55 30.6	1.68	17 56.4	2.10	21.9
10	15 15.1	15 21.5	55 51.9	1.86	56 15.2	2.02	18 48.9	2.27	22.9
11	15 28.3	15 35.5	56 40.3	2.15	57 6.8	2.26	19 45.0	2.40	23.9
12	15 43.0	15 50.7	57 34.4	2.33	58 2.6	2.35	20 43.7	2.47	24.9
13	15 58.4	16 6.0	58 30.9	2.33	58 58.7	2.26	21 43.1	2.46	25.9
14	16 13.2	16 19.9	59 25.2	2.14	59 49.9	1.95	22 41.5	2.39	26.9
15	16 26.0	16 31.1	60 12.0	1.71	60 30.9	1.42	23 37.7	2.30	27.9
16	16 35.2	16 38.2	60 46.1	1.09	60 57.1	+0.73	6		28.9
17	16 40.0	16 40.5	61 3.6	+0.35	61 5.5	−0.03	0 31.7	2.21	0.6
18	16 39.8	16 37.9	61 2.8	−0.41	60 55.7	0.76	1 24.1	2.16	1.6
19	16 34.9	16 30.8	60 44.5	1.08	60 29.7	1.37	2 15.8	2.16	2.6
20	16 25.9	16 20.3	60 11.8	1.60	59 51.4	1.78	3 7.9	2.19	3.6
21	16 14.3	16 7.9	59 29.1	1.91	59 5.5	1.99	4 1.3	2.26	4.6
22	16 1.3	15 54.6	58 41.3	2.03	58 16.8	2.03	4 56.3	2.32	5.6
23	15 48.0	15 41.6	57 52.6	1.99	57 29.0	1.93	5 52.7	2.36	6.6
24	15 35.4	15 29.5	57 6.3	1.85	56 44.6	1.75	6 49.4	2.35	7.6
25	15 23.9	15 18.7	56 24.2	1.65	56 5.1	1.53	7 45.1	2.27	8.6
26	15 13.9	15 9.5	55 47.4	1.42	55 31.0	1.31	8 38.3	2.15	9.6
27	15 5.4	15 1.7	55 16.1	1.19	55 2.5	1.08	9 28.4	2.02	10.6
28	14 58.4	14 55.4	54 50.3	0.96	54 39.4	0.85	10 15.1	1.88	11.6
29	14 52.8	14 50.5	54 29.8	0.75	54 21.5	0.64	10 58.8	1.77	12.6
30	14 48.6	14 47.0	54 14.4	0.54	54 8.6	0.43	11 40.3	1.69	13.6
31	14 45.7	14 44.8	54 4.0	0.33	54 0.6	0.23	12 20.3	1.65	14.6
32	14 44.3	14 44.1	53 58.6	−0.12	53 57.9	−0.00	12 59.8	1.65	15.6



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 1.					FRIDAY 3.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	20 36 13.85	2.0229	S. 18 10 27.2	10.373	0	22 8 10.11	1.8280	S. 8 46 31.4	12.756
1	20 38 15.07	2.0178	18 0 2.6	10.446	1	22 9 59.62	1.8327	8 33 45.2	12.764
2	20 40 15.98	2.0127	17 49 33.7	10.518	2	22 11 48.96	1.8370	8 20 57.3	12.811
3	20 42 16.59	2.0076	17 39 0.5	10.589	3	22 13 38.14	1.8418	8 8 7.9	12.857
4	20 44 16.89	2.0026	17 28 23.0	10.660	4	22 15 27.17	1.8466	7 55 16.9	12.902
5	20 46 16.89	1.9976	17 17 41.4	10.738	5	22 17 16.04	1.8512	7 42 24.5	12.936
6	20 48 16.60	1.9927	17 6 55.7	10.796	6	22 19 4.76	1.8567	7 29 30.6	12.969
7	20 50 16.02	1.9879	16 56 6.0	10.862	7	22 20 53.33	1.8603	7 16 35.4	12.982
8	20 52 15.14	1.9830	16 45 12.3	10.927	8	22 22 41.76	1.8680	7 3 38.8	12.954
9	20 54 13.97	1.9782	16 34 14.7	10.992	9	22 24 30.05	1.8687	6 50 40.9	12.975
10	20 56 12.52	1.9734	16 23 13.3	11.066	10	22 26 18.20	1.8616	6 37 41.8	12.986
11	20 58 10.78	1.9686	16 12 8.1	11.118	11	22 28 6.22	1.7998	6 24 41.5	13.014
12	21 0 8.75	1.9639	16 0 59.1	11.179	12	22 29 54.12	1.7972	6 11 40.1	13.033
13	21 2 6.44	1.9592	15 49 46.5	11.240	13	22 31 41.89	1.7992	5 58 37.6	13.051
14	21 4 3.86	1.9546	15 38 30.3	11.300	14	22 33 29.54	1.7932	5 45 34.0	13.067
15	21 6 0.99	1.9499	15 27 10.5	11.356	15	22 35 17.07	1.7912	5 32 29.5	13.083
16	21 7 57.85	1.9453	15 15 47.3	11.416	16	22 37 4.48	1.7893	5 19 24.0	13.099
17	21 9 54.44	1.9408	15 4 20.6	11.472	17	22 38 51.78	1.7875	5 6 17.6	13.114
18	21 11 50.75	1.9364	14 52 50.6	11.528	18	22 40 38.98	1.7866	4 53 10.3	13.128
19	21 13 46.80	1.9320	14 41 17.3	11.582	19	22 42 26.07	1.7841	4 40 2.2	13.141
20	21 15 42.59	1.9276	14 29 40.7	11.635	20	22 44 13.07	1.7820	4 26 53.4	13.153
21	21 17 38.12	1.9233	14 18 1.0	11.688	21	22 45 59.97	1.7800	4 13 43.8	13.165
22	21 19 33.38	1.9190	14 6 18.1	11.740	22	22 47 46.78	1.7794	4 0 33.6	13.176
23	21 21 28.39	1.9147	S. 13 54 32.1	11.790	23	22 49 33.50	1.7780	S. 3 47 22.7	13.187
THURSDAY 2.					SATURDAY 4.				
0	21 23 23.15	1.9105	S. 13 42 43.2	11.830	0	22 51 20.14	1.7766	S. 3 34 11.2	13.197
1	21 25 17.66	1.9064	13 30 51.4	11.886	1	22 53 6.70	1.7768	3 20 59.1	13.206
2	21 27 11.92	1.9024	13 18 56.6	11.936	2	22 54 53.18	1.7741	3 7 46.5	13.214
3	21 29 5.94	1.8984	13 6 59.0	11.983	3	22 56 39.69	1.7720	2 54 33.5	13.221
4	21 30 59.73	1.8944	12 54 58.6	12.029	4	22 58 25.94	1.7719	2 41 20.0	13.227
5	21 32 53.28	1.8905	12 42 55.5	12.074	5	23 0 12.22	1.7708	2 28 6.2	13.233
6	21 34 46.59	1.8867	12 30 49.7	12.118	6	23 1 58.44	1.7698	2 14 52.0	13.239
7	21 36 39.68	1.8829	12 18 41.3	12.161	7	23 3 44.60	1.7689	2 1 37.5	13.244
8	21 38 32.54	1.8791	12 6 30.4	12.203	8	23 5 30.71	1.7681	1 48 22.7	13.248
9	21 40 25.17	1.8754	11 54 16.9	12.245	9	23 7 16.77	1.7673	1 35 7.7	13.251
10	21 42 17.59	1.8718	11 42 1.0	12.285	10	23 9 2.79	1.7665	1 21 52.6	13.254
11	21 44 9.79	1.8682	11 29 42.7	12.324	11	23 10 48.77	1.7660	1 8 37.3	13.256
12	21 46 1.78	1.8647	11 17 23.1	12.363	12	23 12 34.71	1.7654	0 55 21.9	13.257
13	21 47 53.55	1.8612	11 4 59.2	12.401	13	23 14 20.62	1.7649	0 42 6.5	13.257
14	21 49 45.12	1.8578	10 52 34.0	12.438	14	23 16 6.50	1.7645	0 28 51.1	13.257
15	21 51 36.49	1.8544	10 40 6.7	12.473	15	23 17 52.36	1.7641	0 15 35.7	13.256
16	21 53 27.65	1.8510	10 27 37.2	12.508	16	23 19 38.19	1.7638	S. 0 2 20.4	13.254
17	21 55 18.61	1.8477	10 15 5.7	12.542	17	23 21 24.01	1.7635	N. 0 10 54.8	13.253
18	21 57 9.38	1.8445	10 2 32.1	12.575	18	23 23 9.81	1.7633	0 24 9.8	13.248
19	21 58 59.96	1.8414	9 49 56.6	12.607	19	23 24 55.60	1.7631	0 37 24.6	13.245
20	22 0 50.35	1.8383	9 37 19.2	12.638	20	23 26 41.39	1.7633	0 50 39.1	13.240
21	22 2 40.55	1.8352	9 24 30.9	12.669	21	23 28 27.18	1.7633	1 3 53.4	13.235
22	22 4 30.58	1.8323	9 11 58.8	12.699	22	23 30 12.97	1.7632	1 17 7.3	13.229
23	22 6 20.43	1.8294	8 59 16.0	12.728	23	23 31 58.76	1.7633	1 30 20.8	13.223
24	22 8 10.11	1.8265	S. 8 46 31.4	12.756	24	23 33 44.57	1.7634	N. 1 43 34.0	13.216



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 5.					TUESDAY 7.				
0	23 33 44.57	1.7686	N. 1 43 34.0	13.216	0	0 59 53.55	1.8515	N. 11 56 47.3	12.067
1	23 35 30.39	1.7686	1 56 46.7	13.208	1	1 1 44.74	1.8549	12 8 50.1	12.036
2	23 37 16.23	1.7643	2 9 59.0	13.199	2	1 3 36.14	1.8585	12 20 50.4	11.984
3	23 39 2.09	1.7646	2 23 10.7	13.190	3	1 5 27.76	1.8621	12 32 48.2	11.941
4	23 40 47.98	1.7651	2 36 21.8	13.180	4	1 7 19.59	1.8657	12 44 43.3	11.897
5	23 42 33.90	1.7656	2 49 32.3	13.170	5	1 9 11.64	1.8694	12 56 35.8	11.862
6	23 44 19.85	1.7662	3 2 42.2	13.160	6	1 11 3.92	1.8732	13 8 25.6	11.806
7	23 46 5.84	1.7668	3 15 51.4	13.147	7	1 12 56.42	1.8770	13 20 12.6	11.760
8	23 47 51.87	1.7675	3 28 59.8	13.134	8	1 14 49.16	1.8809	13 31 56.8	11.713
9	23 49 37.94	1.7682	3 42 7.5	13.121	9	1 16 42.13	1.8848	13 43 38.2	11.665
10	23 51 24.07	1.7689	3 55 14.3	13.107	10	1 18 35.34	1.8886	13 55 16.6	11.616
11	23 53 10.25	1.7702	4 8 20.3	13.093	11	1 20 28.79	1.8929	14 6 52.1	11.567
12	23 54 56.49	1.7712	4 21 25.4	13.078	12	1 22 22.49	1.8970	14 18 24.6	11.517
13	23 56 42.79	1.7726	4 34 29.6	13.062	13	1 24 16.44	1.9012	14 29 54.0	11.465
14	23 58 29.16	1.7734	4 47 32.8	13.045	14	1 26 10.64	1.9055	14 41 20.4	11.413
15	0 0 15.60	1.7746	5 0 35.0	13.028	15	1 28 5.10	1.9099	14 52 43.6	11.360
16	0 2 2.11	1.7760	5 13 36.1	13.010	16	1 29 59.83	1.9143	15 4 3.6	11.306
17	0 3 48.70	1.7778	5 26 36.1	12.991	17	1 31 54.82	1.9187	15 15 20.3	11.252
18	0 5 35.38	1.7797	5 39 35.0	12.972	18	1 33 50.08	1.9232	15 26 33.8	11.197
19	0 7 22.14	1.7801	5 52 32.8	12.952	19	1 35 45.61	1.9278	15 37 43.9	11.140
20	0 9 8.99	1.7817	6 5 29.3	12.931	20	1 37 41.41	1.9324	15 48 50.6	11.082
21	0 10 55.94	1.7830	6 18 24.5	12.910	21	1 39 37.49	1.9371	15 59 53.8	11.024
22	0 12 42.98	1.7849	6 31 18.5	12.888	22	1 41 33.86	1.9419	16 10 53.5	10.965
23	0 14 30.12	1.7868	N. 6 44 11.1	12.866	23	1 43 30.52	1.9467	N. 16 21 49.7	10.906
MONDAY 6.					WEDNESDAY 8.				
0	0 16 17.37	1.7884	N. 6 57 2.4	12.843	0	1 45 27.46	1.9515	N. 16 32 42.2	10.845
1	0 18 4.73	1.7908	7 9 52.2	12.818	1	1 47 24.70	1.9564	16 43 31.1	10.783
2	0 19 52.20	1.7922	7 22 40.6	12.793	2	1 49 22.23	1.9613	16 54 16.2	10.730
3	0 21 39.79	1.7943	7 35 27.4	12.767	3	1 51 20.06	1.9663	17 4 57.5	10.657
4	0 23 27.51	1.7963	7 48 12.7	12.741	4	1 53 18.19	1.9714	17 15 35.0	10.588
5	0 25 15.35	1.7984	8 0 56.4	12.715	5	1 55 16.63	1.9765	17 26 8.6	10.527
6	0 27 3.32	1.8006	8 13 38.5	12.687	6	1 57 15.37	1.9817	17 36 38.2	10.460
7	0 28 51.42	1.8028	8 26 18.9	12.658	7	1 59 14.43	1.9869	17 47 3.8	10.393
8	0 30 39.66	1.8051	8 38 57.5	12.629	8	2 1 13.80	1.9921	17 57 25.3	10.325
9	0 32 28.04	1.8076	8 51 34.4	12.600	9	2 3 13.48	1.9974	18 7 42.7	10.256
10	0 34 16.57	1.8101	9 4 9.5	12.570	10	2 5 13.49	2.0028	18 17 55.9	10.184
11	0 36 5.25	1.8127	9 16 42.7	12.538	11	2 7 13.82	2.0082	18 28 4.9	10.113
12	0 37 54.09	1.8163	9 29 14.1	12.506	12	2 9 14.48	2.0137	18 38 9.5	10.041
13	0 39 43.08	1.8179	9 41 43.5	12.474	13	2 11 15.46	2.0192	18 48 9.8	9.967
14	0 41 32.24	1.8206	9 54 11.0	12.441	14	2 13 16.78	2.0248	18 58 5.6	9.898
15	0 43 21.56	1.8234	10 6 36.4	12.407	15	2 15 18.44	2.0304	19 7 57.0	9.818
16	0 45 11.05	1.8268	10 18 59.8	12.372	16	2 17 20.43	2.0360	19 17 43.8	9.742
17	0 47 0.72	1.8292	10 31 21.1	12.337	17	2 19 22.76	2.0417	19 27 26.0	9.664
18	0 48 50.56	1.8322	10 43 40.2	12.301	18	2 21 25.44	2.0475	19 37 3.5	9.586
19	0 50 40.58	1.8363	10 55 57.1	12.263	19	2 23 28.47	2.0533	19 46 36.3	9.506
20	0 52 30.79	1.8394	11 8 11.8	12.225	20	2 25 31.84	2.0591	19 56 4.3	9.426
21	0 54 21.19	1.8416	11 20 24.2	12.187	21	2 27 35.56	2.0650	20 5 27.4	9.344
22	0 56 11.78	1.8448	11 32 34.3	12.148	22	2 29 39.64	2.0709	20 14 45.6	9.261
23	0 58 2.56	1.8481	11 44 42.0	12.108	23	2 31 44.07	2.0768	20 23 58.8	9.178
24	0 59 53.55	1.8515	N. 11 56 47.3	12.067	24	2 33 48.86	2.0828	N. 20 33 7.0	9.098



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 9.					SATURDAY 11.				
0	2 33 48.86	2.0836	N 20 33 7.0	9.083	0	4 20 57.55	2.3791	N 25 50 28.2	2.833
1	2 35 54.01	2.0898	20 42 10.0	9.097	1	4 23 20.46	2.3847	25 54 5.6	2.842
2	2 37 59.52	2.0946	20 51 7.9	8.920	2	4 25 43.71	2.3901	25 57 33.8	2.850
3	2 40 5.39	2.1008	21 0 0.6	8.983	3	4 28 7.28	2.3955	26 0 53.0	2.857
4	2 42 11.62	2.1069	21 8 47.9	8.744	4	4 30 31.17	2.4009	26 4 4.1	2.813
5	2 44 18.92	2.1131	21 17 29.8	8.623	5	4 32 55.38	2.4062	26 7 6.5	2.897
6	2 46 25.19	2.1192	21 26 6.3	8.592	6	4 35 19.91	2.4114	26 10 0.2	2.880
7	2 48 32.53	2.1254	21 34 37.3	8.470	7	4 37 44.75	2.4166	26 12 45.0	2.673
8	2 50 40.94	2.1316	21 43 2.7	8.377	8	4 40 9.89	2.4218	26 15 21.0	2.855
9	2 52 48.32	2.1378	21 51 22.5	8.282	9	4 42 35.34	2.4269	26 17 48.0	2.876
10	2 54 56.78	2.1440	21 59 38.5	8.186	10	4 45 1.08	2.4316	26 20 6.1	2.836
11	2 57 5.61	2.1502	22 7 44.8	8.089	11	4 47 27.11	2.4368	26 22 15.2	2.075
12	2 59 14.81	2.1565	22 15 47.2	7.991	12	4 49 53.43	2.4411	26 24 15.1	1.928
13	3 1 24.39	2.1628	22 23 43.7	7.892	13	4 52 20.04	2.4458	26 26 5.9	1.789
14	3 3 34.35	2.1691	22 31 34.2	7.792	14	4 54 46.92	2.4504	26 27 47.4	1.645
15	3 5 44.69	2.1755	22 39 18.7	7.690	15	4 57 14.07	2.4549	26 29 19.7	1.481
16	3 7 55.41	2.1818	22 46 57.0	7.587	16	4 59 41.50	2.4598	26 30 42.7	1.306
17	3 10 6.51	2.1882	22 54 29.1	7.483	17	5 2 9.19	2.4637	26 31 56.3	1.148
18	3 12 18.00	2.1945	23 1 55.0	7.378	18	5 4 37.14	2.4679	26 33 0.5	0.989
19	3 14 29.80	2.2009	23 9 14.6	7.272	19	5 7 5.34	2.4720	26 33 55.2	0.832
20	3 16 42.11	2.2073	23 16 27.7	7.165	20	5 9 33.78	2.4761	26 34 40.4	0.673
21	3 18 54.74	2.2137	23 23 34.4	7.057	21	5 12 2.47	2.4801	26 35 16.0	0.513
22	3 21 7.75	2.2200	23 30 34.5	6.947	22	5 14 31.39	2.4839	26 35 42.0	0.353
23	3 23 21.14	2.2264	N 23 37 28.0	6.836	23	5 17 0.54	2.4876	N 26 35 58.4	0.194
FRIDAY 10.					SUNDAY 12.				
0	3 25 34.92	2.2328	N 23 44 14.8	6.724	0	5 19 29.91	2.4912	N 26 36 5.0	0.039
1	3 27 49.08	2.2392	23 50 54.9	6.611	1	5 21 59.49	2.4947	26 36 1.8	0.134
2	3 30 3.63	2.2455	23 57 28.1	6.497	2	5 24 29.28	2.4981	26 35 48.9	0.288
3	3 32 18.56	2.2519	24 3 54.4	6.381	3	5 26 59.27	2.5014	26 35 26.1	0.442
4	3 34 33.86	2.2582	24 10 13.8	6.264	4	5 29 29.45	2.5046	26 34 53.5	0.627
5	3 36 49.54	2.2645	24 16 26.1	6.146	5	5 31 59.82	2.5079	26 34 10.9	0.792
6	3 39 5.60	2.2708	24 22 31.3	6.027	6	5 34 30.36	2.5106	26 33 18.4	0.968
7	3 41 22.04	2.2771	24 28 29.3	5.906	7	5 37 1.07	2.5138	26 32 16.0	1.134
8	3 43 38.85	2.2833	24 34 20.0	5.784	8	5 39 31.95	2.5169	26 31 3.5	1.291
9	3 45 56.03	2.2896	24 40 3.4	5.662	9	5 42 2.99	2.5198	26 29 41.0	1.450
10	3 48 13.59	2.2957	24 45 39.4	5.539	10	5 44 34.17	2.5229	26 28 8.4	1.607
11	3 50 31.52	2.3019	24 51 8.0	5.415	11	5 47 5.50	2.5258	26 26 25.7	1.766
12	3 52 49.82	2.3080	24 56 29.0	5.291	12	5 49 36.96	2.5286	26 24 33.0	1.924
13	3 55 8.49	2.3141	25 1 42.4	5.169	13	5 52 8.56	2.5317	26 23 30.1	2.132
14	3 57 27.52	2.3202	25 6 48.1	5.046	14	5 54 40.28	2.5347	26 21 17.0	2.302
15	3 59 46.92	2.3263	25 11 46.1	4.921	15	5 57 12.12	2.5376	26 17 53.7	2.472
16	4 2 6.68	2.3323	25 16 36.3	4.796	16	5 59 44.07	2.5404	26 15 20.3	2.642
17	4 4 26.80	2.3383	25 21 18.6	4.670	17	6 2 16.12	2.5430	26 12 36.6	2.812
18	4 6 47.28	2.3443	25 25 52.9	4.545	18	6 4 48.27	2.5456	26 9 42.7	2.984
19	4 9 8.12	2.3502	25 30 19.2	4.421	19	6 7 20.51	2.5480	26 6 38.5	3.154
20	4 11 29.31	2.3561	25 34 37.5	4.296	20	6 9 52.83	2.5503	26 3 24.1	3.326
21	4 13 50.85	2.3619	25 38 47.6	4.099	21	6 12 25.92	2.5524	25 59 59.4	3.497
22	4 16 12.74	2.3677	25 42 49.4	3.951	22	6 14 57.08	2.5544	25 56 24.4	3.668
23	4 18 34.97	2.3734	25 46 43.0	3.823	23	6 17 30.90	2.5563	25 53 39.2	3.839
24	4 20 57.55	2.3791	N 25 50 28.2	3.693	24	6 20 2.76	2.5581	N 25 48 43.7	4.010



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
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MONDAY 13.

	h.	m.	s.	°	'	"	°	'	"
0	6	20	2.76	2.4431	N.25	48	43.7	4.050	
1	6	22	35.37	2.4437		25	44	37.9	4.162
2	6	25	8.01	2.4443		25	40	21.8	4.263
3	6	27	40.68	2.4447		25	35	55.4	4.365
4	6	30	13.37	2.4450		25	31	18.8	4.466
5	6	32	46.07	2.4451		25	26	31.9	4.568
6	6	35	18.78	2.4451		25	21	34.7	4.669
7	6	37	51.49	2.4451		25	16	27.2	4.771
8	6	40	24.19	2.4449		25	11	9.5	4.861
9	6	42	56.88	2.4446		25	5	41.5	4.962
10	6	45	29.54	2.4442		25	0	3.3	5.063
11	6	48	2.17	2.4436		24	54	14.9	5.161
12	6	50	34.77	2.4430		24	48	16.4	5.261
13	6	53	7.32	2.4422		24	42	7.7	5.360
14	6	55	39.83	2.4413		24	35	48.8	5.460
15	6	58	12.29	2.4404		24	29	19.9	5.560
16	7	0	44.68	2.4394		24	22	40.9	5.661
17	7	3	17.01	2.4382		24	15	51.9	5.761
18	7	5	49.96	2.4369		24	8	52.8	5.861
19	7	8	21.43	2.4356		24	1	43.7	5.961
20	7	10	53.52	2.4340		23	54	24.7	6.061
21	7	13	25.52	2.4323		23	46	55.8	6.161
22	7	15	57.49	2.4306		23	39	17.0	6.261
23	7	18	29.21	2.4289	N.23	31	28.4	6.361	

WEDNESDAY 15.

	h.	m.	s.	°	'	"	°	'	"
0	8	20	56.13	2.4002	N.19	25	35.9	11.683	
1	8	23	23.64	2.4006		19	13	52.0	11.708
2	8	25	50.94	2.4003		19	2	0.1	11.931
3	8	28	18.03	2.4000		18	50	0.2	12.068
4	8	30	44.91	2.4000		18	37	52.5	12.194
5	8	33	11.58	2.4007		18	25	37.0	12.323
6	8	35	38.03	2.4001		18	13	13.7	12.451
7	8	38	4.26	2.4000		18	0	42.8	12.577
8	8	40	30.28	2.4019		17	48	4.5	12.701
9	8	42	56.08	2.4022		17	35	18.7	12.824
10	8	45	21.66	2.4046		17	22	25.6	12.946
11	8	47	47.02	2.4069		17	9	25.3	13.066
12	8	50	12.17	2.4173		16	56	17.8	13.183
13	8	52	37.10	2.4186		16	43	3.3	13.299
14	8	55	1.80	2.4000		16	29	41.9	13.414
15	8	57	26.28	2.4002		16	16	13.6	13.527
16	8	59	50.54	2.4025		16	2	38.6	13.638
17	9	2	14.58	2.4009		15	48	57.0	13.748
18	9	4	38.40	2.4002		15	35	8.8	13.856
19	9	7	2.00	2.4016		15	21	14.2	13.962
20	9	9	25.38	2.4079		15	7	13.3	14.066
21	9	11	48.55	2.4043		14	53	6.2	14.169
22	9	14	11.50	2.4007		14	38	52.9	14.270
23	9	16	34.23	2.4071	N.14	24	33.7	14.369	

TUESDAY 14.

	h.	m.	s.	°	'	"	°	'	"
0	7	21	0.90	2.4271	N.23	23	30.0	8.065	
1	7	23	32.47	2.4262		23	15	21.8	8.217
2	7	26	3.92	2.4252		23	7	4.0	8.378
3	7	28	35.25	2.4240		22	58	36.5	8.488
4	7	31	6.44	2.4187		22	49	59.5	8.597
5	7	33	37.49	2.4164		22	41	12.9	8.666
6	7	36	8.41	2.4140		22	33	16.8	8.814
7	7	38	39.18	2.4116		22	23	11.2	8.971
8	7	41	9.80	2.4090		22	13	56.3	9.227
9	7	43	40.26	2.4064		22	4	32.0	9.482
10	7	46	10.57	2.4037		21	54	58.5	9.686
11	7	48	40.71	2.4010		21	45	15.8	9.768
12	7	51	10.69	2.4002		21	35	24.0	9.909
13	7	53	40.49	2.4003		21	25	23.1	10.060
14	7	56	10.12	2.4024		21	15	13.2	10.209
15	7	58	39.58	2.4041		21	4	54.4	10.367
16	8	1	8.85	2.4063		20	54	26.8	10.484
17	8	3	37.94	2.4022		20	43	50.4	10.600
18	8	6	6.84	2.4000		20	33	5.2	10.664
19	8	8	35.55	2.4008		20	23	11.4	10.907
20	8	11	4.06	2.4026		20	11	9.1	11.109
21	8	13	32.38	2.4003		19	59	58.3	11.260
22	8	16	0.50	2.4070		19	48	39.1	11.360
23	8	18	28.42	2.4006		19	37	11.6	11.427
24	8	20	56.13	2.4002	N.19	25	35.9	11.683	

THURSDAY 16.

	h.	m.	s.	°	'	"	°	'	"
0	9	18	56.75	2.4756	N.14	10	8.6	14.466	
1	9	21	19.05	2.4690		13	55	37.7	14.562
2	9	23	41.14	2.4603		13	41	1.2	14.656
3	9	26	3.02	2.4506		13	26	19.1	14.747
4	9	28	24.66	2.4403		13	11	31.6	14.836
5	9	30	46.14	2.4306		12	56	38.8	14.924
6	9	33	7.39	2.4204		12	41	40.7	15.010
7	9	35	28.44	2.4100		12	26	37.5	15.095
8	9	37	49.28	2.4006		12	11	20.3	15.177
9	9	40	9.92	2.4003		11	56	16.2	15.257
10	9	42	30.36	2.4000		11	40	58.4	15.333
11	9	44	50.60	2.4007		11	25	36.0	15.413
12	9	47	10.65	2.4006		11	10	9.0	15.487
13	9	49	30.51	2.4006		10	54	37.6	15.560
14	9	51	50.17	2.4001		10	39	1.9	15.630
15	9	54	9.64	2.4000		10	23	22.0	15.699
16	9	56	28.93	2.4100		10	7	38.0	15.766
17	9	58	48.03	2.4100		9	51	50.0	15.831
18	10	1	6.96	2.4100		9	35	58.2	15.894
19	10	3	25.71	2.4110		9	20	2.7	15.956
20	10	5	44.29	2.4001		9	4	3.6	16.014
21	10	8	2.69	2.4006		8	48	1.0	16.073
22	10	10	20.93	2.4006		8	31	55.0	16.127
23	10	12	39.00	2.4006		8	15	45.8	16.180
24	10	14	56.91	2.4071	N. 7	59	33.4	16.221	



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 17.					SUNDAY 19.				
0	h. m. s. 10 14 56.01	2.2971	N. 7 59 33.4	16.221	0	h. m. s. 12 3 19.20	2.2441	S. 5 21 11.4	16.394
1	10 17 14.66	2.2945	7 43 18.0	16.261	1	12 5 33.86	2.2416	5 37 33.8	16.354
2	10 19 32.25	2.2920	7 26 59.7	16.328	2	12 7 48.55	2.2492	5 53 53.6	16.306
3	10 21 49.69	2.2896	7 10 38.7	16.373	3	12 10 3.28	2.2458	6 10 10.7	16.262
4	10 24 6.99	2.2871	6 54 15.0	16.416	4	12 12 18.05	2.2466	6 26 25.0	16.214
5	10 26 24.14	2.2847	6 37 48.8	16.456	5	12 14 32.87	2.2474	6 42 36.4	16.164
6	10 28 41.15	2.2824	6 21 20.1	16.497	6	12 16 47.74	2.2483	6 58 44.7	16.113
7	10 30 58.02	2.2801	6 4 49.1	16.534	7	12 19 2.66	2.2492	7 14 49.9	16.060
8	10 33 14.76	2.2779	5 48 16.0	16.569	8	12 21 17.64	2.2502	7 30 51.9	16.005
9	10 35 31.37	2.2758	5 31 40.9	16.602	9	12 23 32.68	2.2513	7 46 50.6	15.949
10	10 37 47.65	2.2737	5 15 3.7	16.633	10	12 25 47.79	2.2524	8 2 45.8	15.891
11	10 40 4.21	2.2716	4 58 24.7	16.668	11	12 28 2.96	2.2536	8 18 37.5	15.831
12	10 42 20.44	2.2696	4 41 44.1	16.691	12	12 30 18.21	2.2548	8 34 25.6	15.771
13	10 44 36.56	2.2676	4 25 1.9	16.716	13	12 32 33.54	2.2561	8 50 10.0	15.708
14	10 46 52.57	2.2656	4 8 18.2	16.739	14	12 34 48.94	2.2574	9 5 50.5	15.643
15	10 49 8.47	2.2632	3 51 33.1	16.761	15	12 37 4.42	2.2588	9 21 27.1	15.576
16	10 51 24.27	2.2608	3 34 46.8	16.781	16	12 39 19.99	2.2602	9 36 59.6	15.506
17	10 53 39.96	2.2586	3 17 59.4	16.798	17	12 41 35.65	2.2617	9 52 28.0	15.438
18	10 55 55.56	2.2562	3 1 11.0	16.814	18	12 43 51.40	2.2633	10 7 52.2	15.367
19	10 58 11.07	2.2537	2 44 21.7	16.828	19	12 46 7.25	2.2649	10 23 12.1	15.294
20	11 0 26.49	2.2513	2 27 31.6	16.840	20	12 48 23.19	2.2666	10 38 27.5	15.220
21	11 2 41.83	2.2489	2 10 40.9	16.860	21	12 50 39.24	2.2683	10 53 38.4	15.144
22	11 4 57.08	2.2466	1 53 49.6	16.868	22	12 52 55.39	2.2701	11 8 44.8	15.068
23	11 7 12.26	2.2444	N. 1 36 57.9	16.863	23	12 55 11.65	2.2719	S. 11 23 46.5	14.987
SATURDAY 18.					MONDAY 20.				
0	h. m. s. 11 9 27.37	2.2619	N. 1 20 6.0	16.867	0	h. m. s. 12 57 28.02	2.2738	S. 11 38 43.3	14.907
1	11 11 42.41	2.2592	1 3 13.9	16.869	1	12 59 44.50	2.2757	11 53 35.3	14.828
2	11 13 57.39	2.2492	0 46 21.7	16.869	2	13 2 1.10	2.2777	12 8 22.3	14.741
3	11 16 12.31	2.2462	0 29 29.6	16.867	3	13 4 17.82	2.2797	12 23 4.2	14.666
4	11 18 27.17	2.2433	N. 0 12 37.6	16.863	4	13 6 34.66	2.2817	12 37 41.0	14.570
5	11 20 41.98	2.2406	S. 0 4 14.1	16.867	5	13 8 51.62	2.2838	12 52 12.6	14.483
6	11 22 56.75	2.2467	0 21 5.4	16.849	6	13 11 8.71	2.2859	13 6 38.8	14.393
7	11 25 11.47	2.2430	0 37 56.1	16.840	7	13 13 25.92	2.2880	13 20 59.6	14.303
8	11 27 26.15	2.2444	0 54 46.2	16.829	8	13 15 43.27	2.2902	13 35 15.0	14.210
9	11 29 40.79	2.2466	1 11 35.6	16.816	9	13 18 0.75	2.2925	13 49 24.8	14.116
10	11 31 55.41	2.2433	1 28 24.1	16.801	10	13 20 18.37	2.2947	14 3 28.9	14.021
11	11 34 10.00	2.2400	1 45 11.6	16.784	11	13 22 36.12	2.2970	14 17 27.2	13.924
12	11 36 24.57	2.2377	2 1 58.1	16.765	12	13 24 54.01	2.2998	14 31 19.7	13.826
13	11 38 39.12	2.2434	2 18 43.4	16.744	13	13 27 12.04	2.3017	14 45 6.3	13.726
14	11 40 53.06	2.2422	2 35 27.4	16.721	14	13 29 30.22	2.3041	14 58 46.8	13.625
15	11 43 8.19	2.2431	2 52 10.0	16.697	15	13 31 48.54	2.3065	15 12 21.3	13.523
16	11 45 22.71	2.2431	3 8 51.0	16.671	16	13 34 7.01	2.3090	15 25 49.6	13.420
17	11 47 37.93	2.2431	3 25 30.4	16.643	17	13 36 25.63	2.3115	15 39 11.7	13.315
18	11 49 51.76	2.2432	3 42 8.1	16.613	18	13 38 44.39	2.3140	15 52 27.4	13.209
19	11 52 6.29	2.2428	3 58 43.9	16.581	19	13 41 3.31	2.3166	16 5 36.7	13.101
20	11 54 20.84	2.2425	4 15 17.8	16.547	20	13 43 22.38	2.3191	16 18 39.5	12.992
21	11 56 35.40	2.2426	4 31 49.6	16.513	21	13 45 41.60	2.3217	16 31 35.7	12.883
22	11 58 49.97	2.2432	4 48 19.2	16.475	22	13 48 0.98	2.3243	16 44 25.3	12.771
23	12 1 4.57	2.2436	5 4 46.5	16.435	23	13 50 20.52	2.3269	16 57 8.2	12.656
24	12 3 19.20	2.2441	S. 5 21 11.4	16.394	24	13 52 40.21	2.3295	S. 17 9 44.3	12.544



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 21.					THURSDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	13 52 40.21	2.3286	S.17 9 44.3	12.544	1	15 47 10.28	2.4351	S.24 40 57.0	5.286
2	13 55 0.06	2.3321	17 22 13.5	12.429	2	15 49 45.42	2.4362	24 46 48.5	5.782
3	13 57 20.06	2.3347	17 34 35.8	12.313	3	15 52 11.62	2.4371	24 52 30.8	6.027
4	13 59 40.23	2.3374	17 46 51.0	12.196	4	15 54 37.87	2.4379	24 58 3.8	6.473
5	14 2 0.55	2.3400	17 58 59.2	12.076	5	15 57 4.17	2.4387	25 3 27.4	6.317
6	14 4 21.03	2.3427	18 11 0.2	11.957	6	15 59 30.52	2.4394	25 8 41.7	6.161
7	14 6 41.67	2.3453	18 22 54.0	11.836	7	16 1 56.91	2.4401	25 13 46.7	6.006
8	14 9 2.47	2.3480	18 34 40.5	11.714	8	16 4 23.34	2.4407	25 18 42.4	5.849
9	14 11 23.43	2.3506	18 46 19.7	11.591	9	16 6 49.80	2.4412	25 23 28.7	5.692
10	14 13 44.55	2.3533	18 57 51.4	11.467	10	16 9 16.28	2.4416	25 28 5.6	5.537
11	14 16 5.83	2.3560	19 9 15.7	11.342	11	16 11 42.79	2.4419	25 32 33.2	5.381
12	14 18 27.27	2.3586	19 20 32.5	11.216	12	16 14 9.31	2.4422	25 36 51.4	5.224
13	14 20 48.87	2.3612	19 31 41.6	11.089	13	16 16 35.85	2.4428	25 41 0.1	5.067
14	14 23 10.62	2.3639	19 42 43.0	10.960	14	16 19 2.39	2.4432	25 44 59.4	4.910
15	14 25 32.53	2.3665	19 53 36.7	10.829	15	16 21 28.93	2.4429	25 48 49.3	4.753
16	14 27 54.60	2.3691	20 4 22.6	10.699	16	16 23 55.46	2.4430	25 52 29.8	4.596
17	14 30 16.82	2.3717	20 15 0.6	10.568	17	16 26 21.98	2.4418	25 56 0.8	4.439
18	14 32 39.20	2.3743	20 25 30.7	10.436	18	16 28 48.48	2.4415	25 59 22.4	4.281
19	14 35 1.73	2.3769	20 35 52.8	10.301	19	16 31 14.96	2.4411	26 2 34.5	4.124
20	14 37 24.42	2.3794	20 46 6.9	10.167	20	16 33 41.41	2.4406	26 5 37.2	3.966
21	14 39 47.26	2.3819	20 56 12.8	10.032	21	16 36 7.83	2.4399	26 8 30.5	3.809
22	14 43 10.25	2.3844	21 6 10.6	9.896	22	16 38 34.31	2.4392	26 11 14.4	3.652
23	14 44 33.39	2.3869	21 16 0.2	9.767	23	16 41 0.54	2.4384	26 13 48.8	3.495
	14 46 56.68	2.3893	S.21 25 41.5	9.619		16 43 26.82	2.4376	S.26 16 13.8	3.338
WEDNESDAY 22.					FRIDAY 24.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	14 49 20.11	2.3917	S.21 35 14.5	9.480	1	16 45 53.04	2.4366	S.26 18 29.4	3.181
2	14 51 43.68	2.3941	21 44 39.2	9.341	2	16 48 19.20	2.4356	26 20 35.6	3.025
3	14 54 7.40	2.3965	21 53 55.4	9.201	3	16 50 45.30	2.4343	26 22 32.4	2.869
4	14 56 31.26	2.3989	22 3 3.2	9.060	4	16 53 11.33	2.4330	26 24 19.8	2.713
5	14 58 55.25	2.4010	22 12 2.5	8.916	5	16 55 37.28	2.4317	26 25 57.9	2.557
6	15 1 19.37	2.4032	22 20 53.2	8.773	6	16 58 3.15	2.4308	26 27 26.7	2.402
7	15 3 43.63	2.4054	22 29 35.3	8.630	7	17 0 28.92	2.4298	26 28 46.1	2.246
8	15 6 8.02	2.4075	22 38 8.8	8.486	8	17 2 54.60	2.4271	26 29 56.2	2.091
9	15 8 32.53	2.4096	22 46 33.6	8.341	9	17 5 20.17	2.4254	26 30 57.0	1.936
10	15 10 57.17	2.4116	22 54 49.6	8.194	10	17 7 45.64	2.4236	26 31 48.5	1.781
11	15 13 21.93	2.4136	23 2 58.9	8.047	11	17 10 11.00	2.4217	26 32 30.8	1.627
12	15 15 46.80	2.4156	23 10 55.3	7.900	12	17 12 36.24	2.4196	26 33 3.8	1.473
13	15 18 11.79	2.4174	23 18 44.9	7.752	13	17 15 1.35	2.4175	26 33 27.6	1.320
14	15 20 36.89	2.4192	23 26 25.6	7.604	14	17 17 26.33	2.4158	26 33 42.2	1.167
15	15 23 2.10	2.4210	23 33 57.4	7.456	15	17 19 51.18	2.4130	26 33 47.6	1.014
16	15 25 27.41	2.4227	23 41 20.2	7.305	16	17 22 15.89	2.4106	26 33 43.9	0.860
17	15 27 52.83	2.4243	23 48 34.0	7.155	17	17 24 40.45	2.4081	26 33 31.1	0.706
18	15 30 18.34	2.4259	23 55 38.8	7.004	18	17 27 4.86	2.4056	26 33 9.2	0.551
19	15 32 43.94	2.4274	24 2 34.5	6.853	19	17 29 29.12	2.4030	26 32 38.2	0.397
20	15 35 9.63	2.4289	24 9 21.1	6.701	20	17 31 53.21	2.4002	26 31 58.2	0.242
21	15 37 35.41	2.4306	24 15 58.6	6.549	21	17 34 17.14	2.3973	26 31 9.2	0.089
22	15 40 1.27	2.4316	24 22 27.0	6.397	22	17 36 40.89	2.3944	26 30 11.3	0.040
23	15 42 27.20	2.4328	24 28 46.2	6.244	23	17 39 4.47	2.3914	26 29 4.4	0.189
24	15 44 53.20	2.4340	24 34 56.2	6.090	24	17 41 27.86	2.3883	26 27 48.6	1.337
	15 47 19.28	2.4351	S.24 40 57.0	5.936		17 43 51.07	2.3851	S.26 26 24.0	1.484



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 25.					MONDAY 27.				
0	h. m. s.	s.	S. ° ' "	"	0	h. m. s.	s.	S. ° ' "	"
1	17 43 51.07	2.3661	S. 26 26 24.0	1.464	1	19 33 27.12	2.1643	S. 22 40 18.9	7.867
2	17 46 14.08	2.3619	26 24 50.5	1.631	2	19 35 36.81	2.1608	22 32 40.5	7.891
3	17 48 36.90	2.3786	26 23 8.3	1.777	3	19 37 46.18	2.1585	22 24 56.0	7.798
4	17 50 59.51	2.3762	26 21 17.4	1.923	4	19 39 55.33	2.1481	22 17 5.3	7.896
5	17 53 21.92	2.3717	26 19 17.7	2.067	5	19 42 3.95	2.1488	22 9 8.6	7.896
6	17 55 44.12	2.3682	26 17 9.4	2.211	6	19 44 12.35	2.1374	22 1 5.9	8.005
7	17 58 6.10	2.3646	26 14 52.4	2.364	7	19 46 20.44	2.1381	21 52 57.9	8.198
8	18 0 27.86	2.3608	26 12 26.9	2.496	8	19 48 28.20	2.1367	21 44 42.7	8.390
9	18 2 49.39	2.3570	26 9 52.9	2.638	9	19 50 35.64	2.1214	21 36 22.4	8.396
10	18 5 10.69	2.3531	26 7 10.4	2.779	10	19 52 42.75	2.1180	21 27 56.3	8.482
11	18 7 31.76	2.3491	26 4 19.4	2.919	11	19 54 49.55	2.1106	21 19 24.6	8.676
12	18 9 52.59	2.3461	26 1 20.0	3.059	12	19 56 56.03	2.1083	21 10 47.2	8.689
13	18 12 13.18	2.3410	25 58 12.3	3.198	13	19 59 2.19	2.1000	21 2 4.3	8.761
14	18 14 33.52	2.3369	25 54 56.3	3.336	14	20 1 8.03	2.0947	20 53 15.9	8.862
15	18 16 53.61	2.3327	25 51 32.0	3.473	15	20 3 13.55	2.0894	20 44 22.1	8.942
16	18 19 13.45	2.3285	25 47 59.5	3.610	16	20 5 18.76	2.0841	20 35 22.9	9.081
17	18 21 33.03	2.3242	25 44 18.8	3.746	17	20 7 23.65	2.0788	20 26 18.4	9.119
18	18 23 52.35	2.3198	25 40 30.0	3.880	18	20 9 28.22	2.0736	20 17 8.6	9.206
19	18 26 11.41	2.3154	25 36 33.2	4.014	19	20 11 32.48	2.0684	20 7 53.7	9.292
20	18 28 30.90	2.3109	25 32 28.4	4.147	20	20 13 36.43	2.0632	19 58 33.7	9.376
21	18 30 48.72	2.3063	25 28 15.6	4.279	21	20 15 40.07	2.0580	19 49 8.6	9.459
22	18 33 6.96	2.3017	25 23 54.9	4.410	22	20 17 43.40	2.0529	19 39 38.5	9.542
23	18 35 24.93	2.2971	25 19 26.4	4.540	23	20 19 46.42	2.0476	19 30 3.5	9.624
24	18 37 42.62	2.2924	S. 25 14 50.1	1.670	24	20 21 49.13	2.0427	S. 19 20 23.7	9.704
SUNDAY 26.					TUESDAY 28.				
0	h. m. s.	s.	S. ° ' "	"	0	h. m. s.	s.	S. ° ' "	"
1	18 40 0.03	2.2877	S. 25 10 6.0	4.799	1	20 23 51.54	2.0376	S. 19 10 39.0	9.783
2	18 42 17.15	2.2829	25 5 14.3	4.926	2	20 25 53.65	2.0326	19 0 49.6	9.862
3	18 44 33.98	2.2781	25 0 14.9	5.062	3	20 27 56.45	2.0276	18 50 55.5	9.940
4	18 46 50.59	2.2732	24 55 7.9	5.178	4	20 29 58.95	2.0226	18 40 56.8	10.017
5	18 49 6.76	2.2683	24 49 53.5	5.303	5	20 31 58.15	2.0176	18 30 53.5	10.093
6	18 51 22.71	2.2633	24 44 31.6	5.426	6	20 33 59.05	2.0126	18 20 45.7	10.167
7	18 53 38.36	2.2583	24 39 2.4	5.549	7	20 35 59.66	2.0077	18 10 33.5	10.240
8	18 55 53.71	2.2533	24 33 25.8	5.671	8	20 37 59.98	2.0026	18 0 16.9	10.313
9	18 58 8.76	2.2482	24 27 41.9	5.792	9	20 40 0.00	1.9980	17 49 56.0	10.385
10	19 0 23.50	2.2431	24 21 50.8	5.912	10	20 41 59.73	1.9932	17 39 30.8	10.455
11	19 2 37.94	2.2380	24 15 52.5	6.031	11	20 43 59.18	1.9884	17 29 1.4	10.524
12	19 4 52.07	2.2329	24 9 47.2	6.148	12	20 45 58.34	1.9837	17 18 27.8	10.593
13	19 7 5.89	2.2278	24 3 34.8	6.265	13	20 47 57.22	1.9790	17 7 50.2	10.661
14	19 9 19.40	2.2226	23 57 15.4	6.381	14	20 49 55.81	1.9743	16 57 8.5	10.727
15	19 11 32.60	2.2174	23 50 49.1	6.496	15	20 51 54.13	1.9697	16 46 22.9	10.792
16	19 13 45.48	2.2121	23 44 15.9	6.609	16	20 53 52.17	1.9651	16 35 33.4	10.857
17	19 15 58.05	2.2068	23 37 38.0	6.722	17	20 55 49.94	1.9606	16 24 40.0	10.921
18	19 18 10.30	2.2016	23 30 49.3	6.834	18	20 57 47.44	1.9561	16 13 42.8	10.984
19	19 20 22.23	2.1963	23 23 55.9	6.945	19	20 59 44.67	1.9516	16 2 41.9	11.046
20	19 22 33.84	2.1909	23 16 55.9	7.054	20	21 1 41.63	1.9472	15 51 37.3	11.107
21	19 24 45.13	2.1856	23 9 49.4	7.163	21	21 3 38.33	1.9428	15 40 29.1	11.167
22	19 26 56.11	2.1802	23 2 36.4	7.271	22	21 5 34.77	1.9385	15 29 17.4	11.226
23	19 29 6.77	2.1749	22 55 16.9	7.378	23	21 7 30.95	1.9342	15 18 2.1	11.288
24	19 31 17.11	2.1695	22 47 51.0	7.483	24	21 9 26.88	1.9300	15 6 43.4	11.348
	19 33 27.12	2.1642	S. 22 40 18.9	7.587		21 11 22.55	1.9256	S. 14 55 21.3	11.396



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 29.					FRIDAY 31.				
0	21 11 23.55	1.9228	S. 14 55 21.3	11.286	0	22 39 56.97	1.7856	S. 5 0 38.4	13.060
1	21 13 17.97	1.9217	14 43 55.9	11.461	1	22 41 44.07	1.7843	4 47 34.3	13.076
2	21 15 13.15	1.9176	14 32 27.2	11.505	2	22 43 31.09	1.7829	4 34 29.4	13.090
3	21 17 8.08	1.9136	14 20 55.3	11.556	3	22 45 18.02	1.7815	4 21 23.6	13.102
4	21 19 2.77	1.9096	14 9 20.2	11.610	4	22 47 4.87	1.7801	4 8 17.1	13.115
5	21 20 57.22	1.9068	13 57 42.0	11.662	5	22 48 51.64	1.7788	3 55 9.8	13.127
6	21 22 51.43	1.9016	13 46 0.7	11.713	6	22 50 38.33	1.7776	3 42 1.9	13.138
7	21 24 45.41	1.8978	13 34 16.4	11.762	7	22 52 24.95	1.7764	3 28 53.3	13.148
8	21 26 39.16	1.8940	13 22 29.2	11.811	8	22 54 11.50	1.7752	3 15 44.1	13.158
9	21 28 32.68	1.8902	13 10 39.1	11.860	9	22 55 57.99	1.7742	3 2 34.4	13.167
10	21 30 25.98	1.8868	12 58 46.1	11.906	10	22 57 44.41	1.7732	2 49 24.1	13.175
11	21 32 19.05	1.8830	12 46 50.4	11.962	11	22 59 30.78	1.7722	2 36 13.4	13.182
12	21 34 11.91	1.8792	12 34 51.9	11.997	12	23 1 17.09	1.7714	2 23 2.2	13.188
13	21 36 4.55	1.8756	12 22 50.6	12.041	13	23 3 3.35	1.7706	2 9 50.7	13.194
14	21 37 56.98	1.8731	12 10 47.0	12.084	14	23 4 49.57	1.7699	1 56 38.9	13.199
15	21 39 49.20	1.8698	11 58 40.6	12.127	15	23 6 35.74	1.7692	1 43 26.8	13.203
16	21 41 41.22	1.8658	11 46 31.7	12.169	16	23 8 21.87	1.7686	1 30 14.4	13.207
17	21 43 33.03	1.8619	11 34 20.4	12.209	17	23 10 7.97	1.7680	1 17 1.9	13.210
18	21 45 24.65	1.8586	11 22 6.6	12.249	18	23 11 54.03	1.7674	1 3 49.2	13.213
19	21 47 16.07	1.8554	11 9 50.5	12.288	19	23 13 40.07	1.7670	0 50 36.4	13.213
20	21 49 7.30	1.8523	10 57 32.0	12.325	20	23 15 26.08	1.7666	0 37 23.5	13.214
21	21 50 58.34	1.8492	10 45 11.2	12.363	21	23 17 12.07	1.7662	0 24 10.6	13.214
22	21 52 49.20	1.8461	10 32 48.4	12.399	22	23 18 58.04	1.7660	S. 0 10 57.8	13.213
23	21 54 39.87	1.8431	S. 10 20 23.3	12.435	23	23 20 44.00	1.7656	N. 0 2 15.0	13.212
THURSDAY 30.					SATURDAY, SEPTEMBER 1.				
0	21 56 36.36	1.8401	S. 10 7 56.1	12.470	0	23 22 29.94	1.7657	N. 0 15 27.7	13.210
1	21 58 26.68	1.8373	9 55 26.9	12.504	PHASES OF THE MOON.				
2	22 0 10.82	1.8348	9 42 55.6	12.537					
3	22 2 0.79	1.8316	9 30 22.4	12.570					
4	22 3 50.59	1.8287	9 17 47.2	12.602					
5	22 5 40.23	1.8260	9 5 10.2	12.632	<div>Day. h. m.</div> <div>○ Full Moon, . . . 1 5 33.6</div> <div>☾ Last Quarter, . . . 9 9 23.4</div> <div>● New Moon, . . . 16 10 20.2</div> <div>☽ First Quarter, . . . 23 0 49.8</div> <div>○ Full Moon, . . . 30 20 57.4</div>				
6	22 7 29.71	1.8234	8 52 31.4	12.661					
7	22 9 19.03	1.8208	8 39 50.9	12.690					
8	22 11 8.20	1.8182	8 27 8.6	12.718					
9	22 12 57.22	1.8158	8 14 24.7	12.746	<div>Day. h.</div> <div>☾ Apogee, . . . . 5 1.8</div> <div>☾ Perigee, . . . . 17 11.0</div>				
10	22 14 46.09	1.8134	8 1 39.1	12.773					
11	22 16 34.62	1.8111	7 48 52.0	12.798					
12	22 18 23.42	1.8088	7 36 3.3	12.823					
13	22 20 11.88	1.8066	7 23 13.2	12.847					
14	22 22 0.21	1.8044	7 10 21.7	12.870					
15	22 23 48.41	1.8022	6 57 28.8	12.893					
16	22 25 36.48	1.8002	6 44 34.5	12.915					
17	22 27 24.43	1.7982	6 31 39.0	12.936					
18	22 29 12.26	1.7962	6 18 42.2	12.956					
19	22 30 59.98	1.7944	6 5 44.3	12.975					
20	22 32 47.59	1.7925	5 52 45.2	12.994					
21	22 34 35.09	1.7907	5 39 45.0	13.012					
22	22 36 22.48	1.7890	5 26 43.8	13.029					
23	22 38 9.77	1.7874	5 13 41.6	13.046					
24	22 39 56.97	1.7858	S. 5 0 38.4	13.060					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
1	Spica W.	104 52 59	2930	106 24 40	2937	107 56 12	2944	109 27 35	2960
	Antares W.	59 6 9	2928	60 37 59	2930	62 9 40	2937	63 41 12	2943
	Mars W.	16 55 41	3008	18 24 36	3009	19 54 2	3019	21 23 51	3007
	$\alpha$ Pegasi E.	47 46 35	3327	46 20 58	3330	44 55 48	3376	43 31 8	3301
	$\alpha$ Arietis E.	88 52 58	2937	87 21 26	2946	85 50 4	2961	84 18 50	2966
2	Antares W.	71 16 47	2977	72 47 29	2982	74 18 4	2989	75 48 30	2995
	Mars W.	28 55 35	2983	30 26 9	2983	31 56 43	2984	33 27 16	2985
	$\alpha$ Arietis E.	76 44 51	2992	75 14 28	2998	73 44 14	3005	72 14 7	3011
	Aldebaran E.	108 59 43	3047	107 30 28	3062	106 1 20	3066	104 32 16	3063
3	Antares W.	83 18 55	3022	84 48 40	3027	86 18 19	3033	87 47 51	3038
	Mars W.	40 59 26	2997	42 29 43	3001	43 59 56	3003	45 30 5	3006
	$\alpha$ Aquilæ W.	39 50 32	4880	40 49 3	4773	41 49 2	4675	42 50 22	4587
	$\alpha$ Arietis E.	64 45 28	3041	63 16 6	3046	61 46 50	3062	60 17 41	3066
	Aldebaran E.	97 8 38	3087	95 40 12	3091	94 11 51	3096	92 43 37	3101
4	Antares W.	95 14 12	3047	96 43 14	3060	98 12 13	3063	99 41 8	3068
	Mars W.	52 59 53	3021	54 29 40	3024	55 59 23	3026	57 29 4	3028
	$\alpha$ Aquilæ W.	48 13 53	4280	49 21 23	4210	50 29 40	4161	51 38 41	4122
	$\alpha$ Arietis E.	52 53 28	3080	51 24 54	3085	49 56 26	3089	48 28 3	3092
	Aldebaran E.	85 23 42	3131	83 55 58	3134	82 28 18	3127	81 0 41	3131
5	Mars W.	64 56 50	3096	66 26 18	3087	67 55 45	3038	69 25 11	3039
	$\alpha$ Aquilæ W.	57 32 51	3946	58 45 14	3929	59 58 4	3905	61 11 19	3892
	$\alpha$ Arietis E.	41 7 14	3110	39 39 17	3113	38 11 23	3117	36 43 34	3119
	Aldebaran E.	73 43 34	3144	72 16 18	3147	70 49 5	3148	69 21 53	3150
	Venus E.	114 13 6	3067	112 44 16	3069	111 15 28	3070	109 46 42	3071
	SUN E.	138 22 30	3442	137 1 1	3443	135 39 33	3443	134 18 5	3444
6	Mars W.	76 52 23	3035	78 21 52	3034	79 51 23	3031	81 20 57	3029
	$\alpha$ Aquilæ W.	67 22 57	3786	68 38 14	3789	69 53 48	3754	71 9 38	3740
	Fomalhaut W.	42 39 39	3998	43 51 30	3995	45 4 14	3980	46 17 45	3948
	Aldebaran E.	62 6 22	3167	60 39 19	3167	59 12 17	3167	57 45 16	3157
	Venus E.	102 23 5	3073	100 54 22	3073	99 25 39	3072	97 56 55	3069
	Pollux E.	104 3 55	3096	102 35 40	3098	101 7 22	3091	99 39 2	3088
	SUN E.	127 30 44	3439	126 9 12	3438	124 47 38	3435	123 26 1	3431
7	Mars W.	88 49 37	3013	90 19 34	3008	91 49 37	3008	93 19 46	2997
	$\alpha$ Aquilæ W.	77 32 26	3676	78 49 40	3668	80 7 6	3652	81 24 44	3641
	Fomalhaut W.	52 35 11	3678	53 52 25	3648	55 10 8	3621	56 28 20	3584
	$\alpha$ Pegasi W.	29 47 18	3743	31 3 21	3679	32 20 30	3623	33 38 38	3573
	Aldebaran E.	50 30 11	3157	49 3 9	3167	47 36 7	3167	46 9 6	3157
	Venus E.	90 32 39	3059	89 3 39	3066	87 34 35	3062	86 5 27	3047
	Pollux E.	92 16 19	3069	90 47 31	3063	89 18 36	3058	87 49 35	3052
	SUN E.	116 36 57	3411	115 14 53	3406	113 52 43	3400	112 30 26	3398
8	Mars W.	100 52 23	2965	102 23 20	2967	103 54 27	2960	105 25 43	2940
	$\alpha$ Aquilæ W.	87 55 42	3292	89 14 25	3293	90 33 18	3275	91 52 20	3266
	Fomalhaut W.	63 6 4	3490	64 26 51	3490	65 48 1	3440	67 9 32	3419
	$\alpha$ Pegasi W.	40 21 39	3379	41 44 19	3350	43 7 33	3321	44 31 20	3293
	Aldebaran E.	36 54 10	3163	37 27 16	3166	36 0 26	3172	34 33 43	3178
	Venus E.	78 38 17	3022	77 8 31	3015	75 38 37	3009	74 8 35	3001
	Pollux E.	80 22 29	3017	78 52 37	3008	77 22 34	2999	75 52 20	2990
	SUN E.	105 37 2	3354	104 13 53	3345	102 50 34	3335	101 27 3	3326



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1	Spica W.	110 58 50	2968	112 29 55	2968	114 0 52	2972	115 31 40	2979
	Antares W.	65 12 36	2960	66 43 51	2967	68 14 58	2963	69 45 57	2970
	Mars W.	22 53 55	2969	24 24 10	2991	25 54 34	2967	27 25 3	2965
	$\alpha$ Pegasi E.	42 6 58	3390	40 43 21	3361	39 20 20	3365	37 57 58	3429
	$\alpha$ Arietis E.	82 47 45	2963	81 16 49	2972	79 46 1	2979	78 15 22	2965
2	Antares W.	77 18 49	3001	78 49 1	3006	80 19 6	3012	81 49 4	3018
	Mars W.	34 57 48	2997	36 28 17	2999	37 58 43	2992	39 29 6	2994
	$\alpha$ Arietis E.	70 44 8	3018	69 14 17	3023	67 44 33	3030	66 14 57	3035
	Aldebaran E.	103 3 21	3067	101 34 31	3072	100 5 48	3076	98 37 9	3082
3	Antares W.	89 17 17	3042	90 46 38	3046	92 15 54	3060	93 45 5	3068
	Mars W.	47 0 10	3009	48 30 11	3013	50 0 8	3016	51 30 2	3018
	$\alpha$ Aquilæ W.	43 52 57	4509	44 56 40	4441	46 1 27	4367	47 7 13	4309
	$\alpha$ Arietis E.	58 48 38	3063	57 19 42	3066	55 50 51	3072	54 22 7	3076
	Aldebaran E.	91 15 28	3106	89 47 24	3109	88 19 25	3113	86 51 31	3117
4	Antares W.	101 9 59	3069	102 38 47	3070	104 7 33	3072	105 36 17	3074
	Mars W.	58 58 42	3080	60 28 17	3082	61 57 50	3084	63 27 21	3035
	$\alpha$ Aquilæ W.	52 48 21	4083	53 58 39	4048	55 9 31	4015	56 20 56	3964
	$\alpha$ Arietis E.	46 59 44	3066	45 31 30	3100	44 3 20	3104	42 35 15	3107
	Aldebaran E.	79 33 9	3124	78 5 41	3127	76 38 16	3138	75 10 53	3142
5	Mars W.	70 54 36	3088	72 24 2	3088	73 53 28	3087	75 22 55	3086
	$\alpha$ Aquilæ W.	62 24 57	3880	63 38 57	3840	64 53 18	3821	66 7 58	3803
	$\alpha$ Arietis E.	35 15 48	3123	33 48 6	3126	32 20 28	3130	30 52 55	3133
	Aldebaran E.	67 54 44	3122	66 27 37	3153	65 0 31	3183	63 33 26	3184
	Venus E.	108 17 57	3072	106 49 13	3073	105 20 30	3073	103 51 48	3073
	Sun E.	132 56 38	3444	131 35 11	3423	130 13 43	3422	128 52 14	3441
6	Mars W.	82 50 34	3026	84 20 14	3024	85 49 57	3021	87 19 44	3016
	$\alpha$ Aquilæ W.	72 25 43	3726	73 42 3	3712	74 58 37	3699	76 15 25	3687
	Fomalhaut W.	47 31 68	3800	48 46 51	3771	50 2 23	3738	51 18 30	3706
	Aldebaran E.	56 18 15	3167	54 51 14	3167	53 24 13	3167	51 57 12	3167
	Venus E.	96 28 8	3069	94 59 20	3065	93 30 29	3065	92 1 36	3061
	Pollux E.	98 10 38	3068	96 42 10	3062	95 13 38	3078	93 45 1	3073
	Sun E.	122 4 20	3429	120 42 36	3425	119 20 48	3421	117 58 55	3416
7	Mars W.	94 50 2	2991	96 20 26	2988	97 50 57	2979	99 21 36	2973
	$\alpha$ Aquilæ W.	82 42 34	3631	84 0 35	3621	85 18 47	3611	86 37 9	3601
	Fomalhaut W.	57 47 1	3509	59 6 9	3546	60 25 42	3523	61 45 41	3501
	$\alpha$ Pegasi W.	34 57 42	3529	36 17 34	3487	37 38 13	3447	38 59 36	3412
	Aldebaran E.	44 42 5	3167	43 15 4	3158	41 48 4	3160	40 21 6	3161
	Venus E.	84 36 13	3043	83 6 53	3039	81 37 28	3033	80 7 56	3027
	Pollux E.	86 20 26	3046	84 51 10	3039	83 21 45	3033	81 52 12	3024
	Sun E.	111 8 2	3396	109 45 30	3379	108 22 50	3372	107 0 1	3363
8	Mars W.	106 57 11	2981	108 28 51	2922	110 0 42	2912	111 32 45	2902
	$\alpha$ Aquilæ W.	93 11 31	3558	94 30 51	3550	95 50 20	3543	97 9 57	3535
	Fomalhaut W.	68 31 27	3400	69 53 44	3381	71 16 22	3364	72 39 20	3345
	$\alpha$ Pegasi W.	45 55 40	3267	47 20 30	3242	48 45 50	3218	50 11 38	3194
	Aldebaran E.	33 7 7	3185	31 40 40	3193	30 14 25	3209	28 48 26	3225
	Venus E.	72 38 23	2998	71 8 2	2996	69 37 32	2977	68 6 51	2969
	Pollux E.	74 21 55	2961	72 51 18	2970	71 20 28	2960	69 49 26	2960
	Sun E.	100 3 22	3214	98 39 27	3203	97 15 19	3292	95 50 58	3280



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9	$\alpha$ Aquilæ W.	98 29 42	3229	99 49 34	3228	101 9 33	3510	102 29 39	3612
	Fomalhaut W.	74 2 40	3226	75 26 21	3209	76 50 22	3292	78 14 43	3275
	$\alpha$ Pegasi W.	51 37 54	3171	53 4 38	3180	54 31 47	3129	55 59 23	3106
	Venus E.	66 36 0	2961	65 4 58	2961	63 33 44	2942	62 2 18	2922
	Pollux E.	68 18 10	2939	66 46 40	2927	65 14 56	2916	63 42 57	2908
	SUN E.	94 26 23	2267	93 1 33	2264	91 36 28	2236	90 11 7	2227
10	Fomalhaut W.	85 21 30	3190	86 47 51	3174	88 14 31	3166	89 41 30	3143
	$\alpha$ Pegasi W.	63 23 47	3008	64 53 56	2984	66 24 29	2964	67 55 27	2943
	$\alpha$ Arietis W.	19 48 32	2927	21 20 16	2988	22 52 38	2990	24 25 36	2943
	Venus E.	54 21 54	2979	52 49 8	2969	51 16 9	2966	49 42 56	2946
	Pollux E.	55 59 1	2998	54 25 23	2929	52 51 27	2911	51 17 13	2796
	SUN E.	83 0 7	3182	81 33 0	3135	80 5 33	3119	78 37 47	3102
11	Fomalhaut W.	97 1 7	3006	98 29 58	3008	99 59 5	3040	101 28 98	3026
	$\alpha$ Pegasi W.	75 36 37	2945	77 10 6	2926	78 44 1	2906	80 18 21	2787
	$\alpha$ Arietis W.	32 18 30	2727	33 54 34	2706	35 31 7	2685	37 8 7	2663
	Venus E.	41 53 12	2792	40 18 34	2788	38 43 44	2773	37 8 41	2766
	Pollux E.	43 21 21	2794	41 45 13	2710	40 8 47	2696	38 32 2	2692
	SUN E.	71 13 36	3013	69 43 39	2984	68 12 19	2975	66 42 35	2966
12	$\alpha$ Pegasi W.	88 16 20	2992	89 53 11	2973	91 30 27	2955	93 8 8	2926
	$\alpha$ Arietis W.	45 20 9	2861	46 59 57	2842	48 40 12	2822	50 20 55	2802
	Venus E.	29 11 15	2746	27 35 35	2749	26 0 0	2756	24 24 34	2769
	SUN E.	59 2 50	2989	57 29 38	2938	55 56 0	2919	54 21 57	2799
13	$\alpha$ Arietis W.	58 51 25	2408	60 34 53	2388	62 18 48	2367	64 3 10	2348
	Aldebaran W.	27 47 19	2974	29 24 34	2927	31 2 59	2904	32 42 9	2844
	SUN E.	46 25 11	2701	44 48 39	2661	43 11 27	2662	41 33 57	2643
14	$\alpha$ Arietis W.	72 51 33	2261	74 38 30	2245	76 25 51	2229	78 13 35	2212
	Aldebaran W.	41 10 56	2968	42 54 48	2962	44 39 17	2936	46 24 21	2917
	SUN E.	33 20 12	2646	31 40 15	2636	29 59 55	2623	28 19 14	2607
18	SUN W.	22 27 46	2818	24 13 19	2820	25 58 49	2824	27 44 13	2826
	Spica E.	34 2 17	2987	32 9 41	2944	30 17 15	2922	28 26 1	2901
	Antares E.	79 42 56	2916	77 49 45	2920	75 56 42	2924	74 3 47	2926
19	SUN W.	36 29 8	2946	38 13 33	2974	39 57 43	2964	41 41 43	2964
	Antares E.	64 41 40	2998	62 49 52	2977	60 58 18	2966	59 8 58	2967
	Mars E.	105 47 6	2986	103 55 48	2986	102 4 45	2109	100 13 59	2116
20	SUN W.	50 17 27	2446	51 59 42	2470	53 41 38	2462	55 23 15	2466
	Antares E.	49 54 32	2156	48 4 57	2160	46 15 42	2162	44 26 47	2156
	Mars E.	91 4 20	2179	89 15 21	2192	87 26 42	2206	85 38 23	2219
	$\alpha$ Aquilæ E.	103 1 2	2786	101 26 15	2789	99 51 33	2796	98 17 0	2804
21	SUN W.	63 46 6	2674	65 25 36	2690	67 4 45	2697	68 43 31	2692
	Antares E.	35 27 22	2267	33 40 34	2292	31 54 8	2266	30 8 3	2212
	Mars E.	76 49 13	2296	74 56 6	2311	73 10 29	2296	71 25 1	2242
	$\alpha$ Aquilæ E.	90 27 23	2683	88 54 17	2679	87 21 31	2696	85 49 7	2612
22	SUN W.	76 51 51	2707	78 28 24	2722	80 4 35	2736	81 40 24	2733
	Spica W.	24 36 4	2429	26 19 6	2426	28 1 51	2447	29 44 19	2459
	Mars E.	62 44 6	2424	61 1 6	2441	59 18 29	2456	57 36 16	2474



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9	$\alpha$ Aquilæ W.	103 49 50	2406	105 10 7	2403	106 30 28	2400	107 50 52	2497
	Fomalhaut W.	79 39 24	2337	81 4 26	2340	82 29 48	2324	83 55 29	2307
	$\alpha$ Pegasi W.	57 27 25	2066	58 55 53	2065	60 24 46	2045	61 54 3	2028
	Venus E.	60 30 39	2923	58 58 48	2912	57 26 44	2901	55 54 26	2890
	Pollux E.	62 10 42	2691	60 38 12	2678	59 5 25	2666	57 32 22	2652
	SUN E.	88 45 30	2213	87 19 36	2198	85 53 24	2183	84 26 55	2168
10	Fomalhaut W.	91 8 48	2126	92 36 26	2111	94 4 22	2097	95 32 35	2082
	$\alpha$ Pegasi W.	69 26 51	2934	70 58 40	2904	72 30 54	2884	74 3 33	2865
	$\alpha$ Arietis W.	25 59 8	2618	27 33 13	2704	29 7 49	2771	30 42 55	2749
	Venus E.	48 9 28	2935	46 35 45	2934	45 1 48	2913	43 27 37	2893
	Pollux E.	49 42 40	2782	48 7 49	2767	46 39 38	2758	44 57 9	2739
	SUN E.	77 9 40	2065	75 41 12	2067	74 12 22	2049	72 43 10	2031
11	Fomalhaut W.	102 58 9	2614	104 28 5	2601	105 58 16	2591	107 28 40	2581
	$\alpha$ Pegasi W.	81 53 6	2767	83 28 17	2748	85 3 53	2729	86 39 54	2710
	$\alpha$ Arietis W.	38 45 36	2643	40 23 33	2628	42 1 57	2602	43 40 49	2583
	Venus E.	35 33 27	2757	33 58 3	2728	32 22 32	2748	30 46 56	2744
	Pollux E.	36 54 58	2699	35 17 36	2656	33 39 57	2644	32 9 9	2633
	SUN E.	65 11 27	2937	63 39 55	2917	62 7 58	2898	60 35 37	2878
12	$\alpha$ Pegasi W.	94 46 14	2614	96 24 44	2601	98 3 38	2583	99 42 55	2568
	$\alpha$ Arietis W.	52 2 6	2482	53 43 44	2462	55 25 50	2448	57 8 24	2424
	Venus E.	22 49 28	2791	21 14 46	2831	19 40 45	2854	18 7 40	2927
	SUN E.	52 47 28	2779	51 12 32	2760	49 37 11	2740	48 1 24	2720
13	$\alpha$ Arietis W.	65 47 59	2331	67 33 14	2313	69 18 55	2296	71 5 1	2278
	Aldebaran W.	34 22 21	2409	36 3 22	2475	37 45 11	2444	39 27 43	2415
	SUN E.	39 56 1	2626	38 17 41	2607	36 38 55	2591	34 59 46	2572
14	$\alpha$ Arietis W.	80 1 43	2196	81 50 14	2168	83 39 7	2160	85 28 21	2157
	Aldebaran W.	48 9 56	2394	49 56 5	2374	51 42 43	2356	53 29 49	2338
	SUN E.	26 38 11	2493	24 56 48	2479	23 15 5	2467	21 33 5	2456
18	SUN W.	29 29 31	2236	31 14 40	2241	32 59 40	2248	34 44 30	2256
	Spica E.	26 33 1	2072	24 41 18	2068	22 49 53	2067	20 58 49	2116
	Antares E.	72 11 0	2087	70 18 23	2044	68 25 57	2051	66 33 42	2060
19	SUN W.	43 25 26	2406	45 8 52	2418	46 52 1	2420	48 34 53	2448
	Antares E.	57 15 54	2109	55 25 8	2119	53 34 38	2130	51 44 25	2143
	Mars E.	98 23 27	2120	96 33 13	2141	94 43 19	2153	92 53 39	2166
20	SUN W.	57 4 31	2613	58 45 26	2627	60 26 1	2643	62 6 15	2650
	Antares E.	42 38 12	2309	40 49 58	2323	39 2 5	2337	37 14 33	2351
	Mars E.	83 50 25	2236	82 2 49	2249	80 15 35	2264	78 28 43	2279
	$\alpha$ Aquilæ E.	96 42 37	2613	95 8 26	2624	93 34 29	2635	92 0 47	2649
21	SUN W.	70 21 56	2629	71 59 58	2645	73 37 38	2672	75 14 56	2699
	Antares E.	28 22 21	2227	26 37 1	2248	24 52 4	2257	23 7 28	2272
	Mars E.	69 40 3	2267	67 55 29	2275	66 11 18	2291	64 27 30	2408
	$\alpha$ Aquilæ E.	84 17 5	2292	82 45 27	2293	81 14 15	2272	79 43 29	2296
22	SUN W.	83 15 51	2772	84 50 56	2788	86 25 40	2805	88 0 2	2921
	Spica W.	31 26 30	2473	33 8 21	2496	34 49 54	2496	36 31 10	2512
	Mars E.	55 54 28	2490	54 12 59	2507	52 31 56	2524	50 51 16	2540



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22	$\alpha$ Aquilæ E.	78 13 11	3019	76 43 22	3044	75 14 4	3069	73 45 17	3096
23	SUN W.	89 34 3	2887	91 7 43	2888	92 41 2	2889	94 14 1	2894
	Spica W.	38 12 5	2827	39 52 40	2840	41 32 57	2853	43 12 56	2868
	Mars E.	49 10 59	2857	47 31 6	2874	45 51 35	2891	44 12 27	2907
	$\alpha$ Aquilæ E.	66 30 2	2851	65 4 53	2885	63 40 24	2824	62 16 40	2893
	Fomalhaut E.	90 2 20	2893	88 29 51	2909	86 57 43	2924	85 25 54	2940
24	SUN W.	101 53 56	2963	103 24 57	2976	104 55 40	2990	106 26 5	3006
	Spica W.	51 28 6	2836	53 6 14	2848	54 44 4	2863	56 21 35	2878
	Mars E.	36 2 30	2892	34 25 39	2708	32 49 11	2728	31 13 8	2748
	$\alpha$ Aquilæ E.	55 29 51	2893	54 11 9	2847	52 53 25	2705	51 36 43	2767
	Fomalhaut E.	77 52 10	2929	76 22 33	2947	74 53 19	2967	73 24 29	2987
	$\alpha$ Pegasi E.	98 58 26	2787	97 23 41	2798	95 49 11	2811	94 14 58	2824
25	SUN W.	113 53 50	3073	115 22 34	3088	116 51 1	3098	118 19 13	3110
	Spica W.	64 25 7	2735	66 1 1	2746	67 36 40	2756	69 12 5	2768
	Antares W.	18 34 47	2728	20 10 50	2738	21 46 39	2750	23 22 12	2761
	Fomalhaut E.	66 6 43	3198	64 40 31	3222	63 14 48	3247	61 49 35	3274
	$\alpha$ Pegasi E.	86 27 53	2897	84 55 17	2898	83 22 56	2911	81 50 51	2923
26	SUN W.	125 36 32	3169	127 3 18	3180	128 29 51	3191	129 56 11	3203
	Spica W.	77 5 34	2821	78 39 35	2830	80 13 24	2839	81 47 1	2849
	Antares W.	31 16 25	2815	32 50 34	2824	34 24 31	2833	35 58 16	2842
	Fomalhaut E.	54 51 34	3424	53 29 45	3459	52 8 35	3497	50 48 8	3535
	$\alpha$ Pegasi E.	74 14 24	2987	72 43 55	2989	71 13 41	3018	69 43 44	3026
27	Spica W.	89 32 9	2908	91 4 37	2900	92 36 56	2908	94 9 5	2916
	Antares W.	43 44 5	2887	45 16 41	2894	46 49 7	2901	48 21 24	2909
	Fomalhaut E.	44 17 39	3782	43 2 18	3843	41 48 0	3910	40 34 50	3983
	$\alpha$ Pegasi E.	62 18 4	3004	60 49 47	3108	59 21 47	3123	57 54 5	3138
	$\alpha$ Arietis E.	104 12 3	2903	102 39 47	2910	101 7 41	2917	99 35 44	2924
28	Spica W.	101 47 27	2961	103 18 41	2968	104 49 47	2984	106 20 45	2970
	Antares W.	56 0 26	2945	57 31 48	2951	59 3 2	2958	60 34 8	2963
	$\alpha$ Pegasi E.	50 40 23	3223	49 14 41	3242	47 49 22	3264	46 24 28	3286
	$\alpha$ Arietis E.	91 58 17	2969	90 27 13	2985	88 56 17	2971	87 25 28	2977
29	Antares W.	68 7 49	2991	69 38 13	2997	71 8 30	3001	73 38 41	3006
	Mars W.	26 27 11	3107	27 55 12	3107	29 23 13	3108	30 51 13	3110
	$\alpha$ Pegasi E.	39 26 59	3423	38 5 8	3458	36 43 57	3497	35 23 29	3539
	$\alpha$ Arietis E.	79 53 21	3006	78 23 18	3013	76 53 21	3018	75 23 31	3022
	Aldebaran E.	112 5 55	3083	110 37 0	3067	109 8 10	3070	107 39 24	3074
30	Antares W.	80 8 12	3028	81 37 50	3031	83 7 24	3035	84 36 53	3039
	Mars W.	38 10 43	3119	39 38 29	3122	41 6 12	3124	42 33 52	3127
	$\alpha$ Aquilæ W.	37 51 37	6133	38 46 49	6005	39 43 40	4990	40 42 3	4796
	$\alpha$ Arietis E.	67 55 48	3045	66 26 31	3060	64 57 20	3084	63 28 14	3068
	Aldebaran E.	100 16 40	3091	98 48 19	3095	97 20 3	3098	95 51 51	3101
31	Antares W.	92 3 18	3084	93 32 24	3086	95 1 27	3089	96 30 27	3091
	Mars W.	49 51 24	3140	51 18 46	3143	52 46 5	3144	54 13 21	3147
	$\alpha$ Aquilæ W.	45 53 39	4381	46 59 17	4320	48 5 51	4284	49 13 17	4216
	$\alpha$ Arietis E.	56 3 55	3077	54 35 17	3080	53 6 43	3083	51 38 13	3087
	Aldebaran E.	88 31 46	3115	87 3 55	3119	85 36 8	3121	84 8 24	3124



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
22	$\alpha$ Aquilæ E.	72 17 3	3194	70 49 23	3154	69 22 19	3184	67 55 51	3217
23	SUN W.	95 46 40	2901	97 18 58	2916	98 50 57	2931	100 22 36	2946
	Spica W.	44 52 35	2928	46 31 55	2906	48 10 57	2909	49 49 40	2921
	Mars E.	42 33 42	2934	40 55 19	2641	39 17 20	2657	37 39 43	2675
	$\alpha$ Aquilæ E.	60 53 40	3403	59 31 27	3446	58 10 3	3492	56 49 30	3541
	Fomalhaut E.	83 54 26	2967	82 23 19	2973	80 52 33	2992	79 22 10	3010
24	SUN W.	107 56 12	3018	109 26 2	3022	110 55 35	3046	112 24 51	3060
	Spica W.	57 58 51	2987	59 35 49	2909	61 12 31	2710	62 48 57	2722
	Mars E.	29 37 28	2794	28 2 13	2783	26 27 23	2803	24 52 59	2828
	$\alpha$ Aquilæ E.	50 21 6	2934	49 6 39	2904	47 53 23	2992	46 41 26	4063
	Fomalhaut E.	71 56 4	3108	70 28 4	3129	69 0 30	3162	67 33 23	3174
	$\alpha$ Pegasi E.	92 41 1	2936	91 7 20	2948	89 33 55	2961	88 0 46	2973
25	SUN W.	119 47 10	3123	121 14 52	3134	122 42 20	3147	124 9 33	3169
	Spica W.	70 47 15	2779	72 22 10	2790	73 56 51	2799	75 31 20	2811
	Antares W.	24 57 31	2772	26 32 36	2783	28 7 26	2794	29 42 2	2802
	Fomalhaut E.	60 24 53	3300	59 0 42	3329	57 37 4	3359	56 14 1	3391
	$\alpha$ Pegasi E.	80 19 1	2996	78 47 28	2949	77 16 11	2961	75 45 9	2974
26	SUN W.	131 22 18	3212	132 48 13	3223	134 13 55	3233	135 39 25	3242
	Spica W.	83 20 25	2986	84 53 38	2907	86 26 39	2975	87 59 30	2984
	Antares W.	37 31 49	2992	39 5 10	2961	40 38 19	2969	42 11 17	2977
	Fomalhaut E.	49 28 23	3478	48 9 25	3423	46 51 16	3473	45 34 0	3725
	$\alpha$ Pegasi E.	68 14 3	3099	66 44 38	3092	65 15 30	3065	63 46 38	3060
27	Spica W.	95 41 4	2924	97 12 53	2931	98 44 33	2938	100 16 4	2944
	Antares W.	49 53 31	2917	51 25 28	2924	52 57 16	2931	54 28 58	2939
	Fomalhaut E.	39 22 54	4064	38 12 17	4163	37 3 6	4261	35 55 28	4361
	$\alpha$ Pegasi E.	56 26 41	3184	54 59 37	3170	53 32 52	3187	52 6 27	3207
	$\alpha$ Arietis E.	98 3 56	2992	96 32 18	2989	95 0 49	2946	93 29 29	2968
28	Spica W.	107 51 35	2976	109 22 18	2992	110 52 53	2998	112 23 21	2994
	Antares W.	62 5 7	2909	63 35 58	2975	65 6 42	2981	66 37 19	2986
	$\alpha$ Pegasi E.	45 0 0	3209	43 35 59	3234	42 12 27	3261	40 49 26	3291
	$\alpha$ Arietis E.	85 54 47	2994	84 24 14	2990	82 53 49	2998	81 23 31	3002
29	Antares W.	74 8 46	3011	75 38 45	3015	77 8 39	3019	78 38 27	3023
	Mars W.	32 19 11	3110	33 47 8	3113	35 15 2	3114	36 42 54	3117
	$\alpha$ Pegasi E.	34 3 48	2997	32 44 59	2941	31 27 9	2702	30 10 24	2789
	$\alpha$ Arietis E.	73 53 47	3026	72 24 9	3083	70 54 37	3087	69 25 10	3041
	Aldebaran E.	106 10 43	3078	104 42 6	3061	103 13 33	3084	101 45 4	3098
30	Antares W.	86 6 18	3042	87 35 39	3045	89 4 56	3048	90 34 9	3052
	Mars W.	44 1 29	3180	45 29 2	3123	46 56 33	3124	48 24 1	3128
	$\alpha$ Aquilæ W.	41 41 52	4698	42 43 2	4601	43 45 26	4620	44 49 0	4447
	$\alpha$ Arietis E.	61 59 13	3061	60 30 16	3066	59 1 25	3069	57 32 38	3073
	Aldebaran E.	94 23 43	3104	92 55 38	3107	91 27 37	3110	89 59 40	3113
31	Antares W.	97 59 24	3063	99 28 19	3065	100 57 11	3068	102 26 0	3069
	Mars W.	55 40 34	3148	57 7 46	3161	58 34 54	3153	60 2 0	3153
	$\alpha$ Aquilæ W.	50 21 29	4166	51 30 27	4123	52 40 7	4084	53 50 24	4047
	$\alpha$ Arietis E.	50 9 47	3090	48 41 25	3063	47 13 7	3096	45 44 52	3099
	Aldebaran E.	82 40 44	3126	81 13 6	3129	79 45 31	3130	78 17 58	3133



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sideral Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		h. m. s.	s.		° ' "	"					
Sat.	1	10 43 12.97	9.066	N. 8 7 14.0	54.61	15 53.92	64.40	0 16.01	0.790		
Sun.	2	10 46 50.38	9.054	7 45 19.6	54.93	15 54.15	64.36	0 35.12	0.801		
Mon.	3	10 50 27.51	9.043	7 23 17.5	55.25	15 54.38	64.32	0 54.49	0.812		
Tues.	4	10 54 4.41	9.033	7 1 8.1	55.54	15 54.61	64.28	1 14.09	0.821		
Wed.	5	10 57 41.08	9.024	6 38 51.8	55.83	15 54.85	64.25	1 33.92	0.830		
Thur.	6	11 1 17.54	9.017	6 16 28.9	56.10	15 55.09	64.22	1 53.95	0.838		
Fri.	7	11 4 53.81	9.010	5 53 59.4	56.37	15 55.33	64.19	2 14.18	0.846		
Sat.	8	11 8 29.92	9.004	5 31 23.8	56.61	15 55.57	64.16	2 34.58	0.852		
Sun.	9	11 12 5.89	8.998	5 8 42.7	56.84	15 55.81	64.14	2 55.11	0.858		
Mon.	10	11 15 41.74	8.993	4 45 56.4	57.05	15 56.06	64.12	3 15.75	0.863		
Tues.	11	11 19 17.47	8.989	4 23 5.0	57.26	15 56.31	64.10	3 36.51	0.867		
Wed.	12	11 22 53.12	8.986	4 0 8.6	57.44	15 56.56	64.08	3 57.36	0.870		
Thur.	13	11 26 28.69	8.984	3 37 7.9	57.62	15 56.82	64.07	4 18.29	0.873		
Fri.	14	11 30 4.19	8.982	3 14 3.4	57.77	15 57.08	64.06	4 39.28	0.875		
Sat.	15	11 33 39.65	8.980	2 50 55.4	57.92	15 57.34	64.06	5 0.31	0.877		
Sun.	16	11 37 15.09	8.979	2 27 44.1	58.05	15 57.60	64.06	5 21.36	0.878		
Mon.	17	11 40 50.52	8.979	2 4 29.7	58.17	15 57.87	64.06	5 42.43	0.878		
Tues.	18	11 44 25.94	8.980	1 41 12.8	58.26	15 58.14	64.06	6 3.51	0.877		
Wed.	19	11 48 1.39	8.981	1 17 53.8	58.34	15 58.41	64.07	6 24.56	0.876		
Thur.	20	11 51 36.89	8.983	0 54 33.2	58.40	15 58.68	64.08	6 45.56	0.873		
Fri.	21	11 55 12.44	8.985	0 31 11.1	58.46	15 58.95	64.00	7 6.49	0.871		
Sat.	22	11 58 48.07	8.988	N. 0 7 47.7	58.50	15 59.23	64.11	7 27.35	0.868		
Sun.	23	12 2 23.81	8.992	S. 0 15 36.5	58.58	15 59.51	64.13	7 48.12	0.863		
Mon.	24	12 5 59.67	8.998	0 39 1.1	58.54	15 59.79	64.15	8 8.76	0.858		
Tues.	25	12 9 35.66	9.005	1 2 25.7	58.54	16 0.07	64.17	8 29.26	0.851		
Wed.	26	12 13 11.81	9.612	1 25 50.0	58.52	16 0.35	64.20	8 49.61	0.844		
Thur.	27	12 16 48.15	9.021	1 49 14.0	58.49	16 0.63	64.23	9 9.77	0.835		
Fri.	28	12 20 24.70	9.029	2 12 37.1	58.45	16 0.91	64.27	9 29.72	0.826		
Sat.	29	12 24 1.48	9.039	2 35 58.9	58.39	16 1.19	64.31	9 49.45	0.816		
Sun.	30	12 27 38.51	9.050	2 59 19.1	58.32	16 1.46	64.35	10 8.90	0.806		
Mon.	31	12 31 15.83	9.062	S. 3 22 37.6	58.24	16 1.73	64.39	10 28.08	0.794		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sideral Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		h. m. s.	s.	° ' "	"	m. s.	s.	h. m. s.
Sat.	1	10 43 13.01	9.068	N. 8 7 13.7	54.61	0 16.02	0.790	10 43 29.03
Sun.	2	10 46 50.46	9.054	7 45 19.0	54.93	0 35.13	0.801	10 47 25.59
Mon.	3	10 50 27.64	9.043	7 23 16.6	55.25	0 54.50	0.812	10 51 22.14
Tues.	4	10 54 4.59	9.033	7 1 6.9	55.54	1 14.10	0.821	10 55 18.69
Wed.	5	10 57 41.31	9.024	6 38 50.3	55.83	1 33.94	0.830	10 59 15.25
Thur.	6	11 1 17.82	9.017	6 16 27.1	56.10	1 53.98	0.838	11 3 11.80
Fri.	7	11 4 54.14	9.010	5 53 57.3	56.37	2 14.21	0.846	11 7 8.35
Sat.	8	11 8 30.30	9.004	5 31 21.4	56.61	2 34.61	0.852	11 11 4.91
Sun.	9	11 12 6.32	8.998	5 8 40.0	56.84	2 55.14	0.858	11 15 1.46
Mon.	10	11 15 42.22	8.993	4 45 53.3	57.05	3 15.79	0.863	11 18 58.01
Tues.	11	11 19 18.01	8.989	4 23 1.5	57.26	3 36.56	0.867	11 22 54.57
Wed.	12	11 22 53.71	8.986	4 0 4.8	57.44	3 57.41	0.870	11 26 51.12
Thur.	13	11 26 29.33	8.984	3 37 3.8	57.62	4 18.34	0.873	11 30 47.67
Fri.	14	11 30 4.88	8.982	3 13 59.0	57.77	4 39.34	0.875	11 34 44.22
Sat.	15	11 33 40.39	8.980	2 50 50.6	57.92	5 0.39	0.877	11 38 40.78
Sun.	16	11 37 15.89	8.979	2 27 38.9	58.05	5 21.44	0.878	11 42 37.33
Mon.	17	11 40 51.37	8.979	2 4 24.2	58.17	5 42.51	0.878	11 46 33.88
Tues.	18	11 44 26.84	8.980	1 41 7.0	58.26	6 3.60	0.877	11 50 30.44
Wed.	19	11 48 2.35	8.981	1 17 47.7	58.34	6 24.64	0.876	11 54 26.99
Thur.	20	11 51 37.91	8.983	0 54 26.7	58.40	6 45.64	0.873	11 58 23.55
Fri.	21	11 55 13.51	8.985	0 31 4.2	58.46	7 6.59	0.871	12 2 20.10
Sat.	22	11 58 49.20	8.988	N. 0 7 40.5	58.50	7 27.45	0.868	12 6 16.65
Sun.	23	12 2 24.99	8.992	S. 0 15 44.0	58.53	7 48.22	0.863	12 10 13.21
Mon.	24	12 6 0.90	8.998	0 39 8.9	58.54	8 8.86	0.858	12 14 9.76
Tues.	25	12 9 36.94	9.005	1 2 33.9	58.54	8 29.37	0.851	12 18 6.31
Wed.	26	12 13 13.14	9.012	1 25 58.6	58.52	8 49.73	0.844	12 22 2.87
Thur.	27	12 16 49.53	9.021	1 49 22.9	58.49	9 9.89	0.835	12 25 59.42
Fri.	28	12 20 26.13	9.029	2 12 46.3	58.45	9 29.84	0.826	12 29 55.97
Sat.	29	12 24 2.96	9.039	2 36 8.4	58.39	9 49.57	0.816	12 33 52.53
Sun.	30	12 27 40.05	9.050	2 59 29.0	58.32	10 9.03	0.806	12 37 49.08
Mon.	31	12 31 17.41	9.062	S. 3 22 47.8	58.24	10 28.22	0.794	12 41 45.63

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

THE SUN'S										Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
Day of the Month.	Day of the Year.	True LONGITUDE.		Diff. for 1 hour.	LATITUDE.							
		$\lambda$	$\lambda'$									
1	245	159° 13' 21.3	12° 32.1	145.29	+0.56	0.0036655	43.9	h. m. s. 13 14 20.48				
2	246	160 11 29.1	10 39.8	145.34	0.63	.0035596	44.2	13 10 24.57				
3	247	161 9 38.8	8 49.4	145.44	0.66	.0034532	44.4	13 6 28.66				
4	248	162 7 50.4	7 0.9	145.52	0.66	.0033462	44.6	13 2 32.75				
5	249	163 6 4.0	5 14.4	145.60	0.64	.0032386	44.9	12 58 36.85				
6	250	164 4 19.5	3 29.8	145.68	0.59	.0031303	45.2	12 54 40.94				
7	251	165 2 37.0	1 47.2	145.77	0.51	.0030213	45.6	12 50 45.03				
8	252	166 0 56.6	0 6.6	145.86	0.42	.0029114	46.0	12 46 49.12				
9	253	166 59 18.4	58 28.3	145.95	0.30	.0028006	46.4	12 42 53.21				
10	254	167 57 42.3	56 52.1	146.04	0.17	.0026887	46.8	12 38 57.31				
11	255	168 56 8.3	55 18.0	146.13	+0.04	.0025756	47.2	12 35 1.40				
12	256	169 54 36.4	53 46.0	146.21	-0.09	.0024613	47.8	12 31 5.49				
13	257	170 53 6.5	52 16.0	146.30	0.22	.0023458	48.4	12 27 9.58				
14	258	171 51 38.6	50 48.0	146.38	0.33	.0022290	49.0	12 23 13.68				
15	259	172 50 12.7	49 22.0	146.46	0.42	.0021109	49.6	12 19 17.78				
16	260	173 48 48.7	47 57.9	146.54	0.49	.0019915	50.1	12 15 21.87				
17	261	174 47 26.6	46 35.7	146.62	0.51	.0018708	50.5	12 11 25.96				
18	262	175 46 6.3	45 15.3	146.70	0.51	.0017489	50.9	12 7 30.05				
19	263	176 44 47.7	43 56.6	146.77	0.47	.0016259	51.3	12 3 34.14				
20	264	177 43 30.9	42 39.7	146.84	0.42	.0015020	51.7	11 59 38.24				
21	265	178 42 15.9	41 24.6	146.91	0.34	.0013773	52.1	11 55 42.33				
22	266	179 41 2.6	40 11.2	146.98	0.24	.0012520	52.3	11 51 46.42				
23	267	180 39 51.0	38 59.5	147.05	-0.12	.0011262	52.5	11 47 50.51				
24	268	181 38 41.1	37 49.5	147.12	+0.01	.0010001	52.6	11 43 54.60				
25	269	182 37 32.9	36 41.2	147.19	0.14	.0008740	52.6	11 39 58.70				
26	270	183 36 26.5	35 34.7	147.27	0.27	.0007479	52.6	11 36 2.79				
27	271	184 35 21.9	34 30.0	147.35	0.38	.0006219	52.5	11 32 6.88				
28	272	185 34 19.2	33 27.2	147.43	0.48	.0004961	52.4	11 28 10.97				
29	273	186 33 18.4	32 26.3	147.51	0.54	.0003705	52.3	11 24 15.06				
30	274	187 32 19.5	31 27.3	147.59	0.59	.0002453	52.1	11 20 19.17				
31	275	188 31 22.7	30 30.4	147.68	+0.60	0.0001207	51.8	11 16 23.26				

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 04.



## GREENWICH MEAN TIME.

## THE MOON'S

THE MOON'S									
Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.	Diff. for 1 hour.		
							h.	m.	
1	14 44.3	14 44.1	53 58.6	—0.12	53 57.9	—0.00	12 59.8	1.65	15.6
2	14 44.3	14 44.9	53 58.6	+0.13	54 0.9	+0.26	13 39.8	1.69	16.6
3	14 46.0	14 47.5	54 4.8	0.40	54 10.5	0.55	14 21.1	1.76	17.6
4	14 49.6	14 52.2	54 18.1	0.71	54 27.5	0.87	15 4.6	1.87	18.6
5	14 55.3	14 59.0	54 39.0	1.04	54 52.6	1.22	15 51.0	2.01	19.6
6	15 3.3	15 8.1	55 8.3	1.39	55 26.1	1.57	16 40.9	2.15	20.6
7	15 13.5	15 19.4	55 45.9	1.74	56 7.8	1.90	17 34.2	2.28	21.6
8	15 25.9	15 32.8	56 31.5	2.05	56 56.9	2.18	18 30.1	2.37	22.6
9	15 40.1	15 47.7	57 23.8	2.28	57 51.7	2.35	19 27.4	2.39	23.6
10	15 55.5	16 3.3	58 20.2	2.38	58 48.9	2.37	20 24.7	2.37	24.6
11	16 11.0	16 18.4	59 17.1	2.30	59 44.1	2.18	21 20.8	2.30	25.6
12	16 25.3	16 31.4	60 9.3	1.99	60 31.9	1.74	22 15.3	2.24	26.6
13	16 36.6	16 40.8	60 51.2	1.44	61 6.6	1.10	23 8.5	2.20	27.6
14	16 43.8	16 45.4	61 17.5	+0.71	61 23.6	+0.30	♂		28.6
15	16 45.7	16 44.6	61 24.6	—0.13	61 20.6	—0.54	0 1.2	2.20	0.2
16	16 42.2	16 38.5	61 11.6	0.94	60 58.1	1.30	0 54.3	2.24	1.2
17	16 33.7	16 27.9	60 40.4	1.62	60 19.2	1.88	1 48.9	2.31	2.2
18	16 21.3	16 14.2	59 55.2	2.09	59 29.0	2.24	2 45.3	2.39	3.2
19	16 6.7	15 59.1	59 1.4	2.32	58 33.2	2.35	3 43.2	2.43	4.2
20	15 51.4	15 43.8	58 4.9	2.34	57 37.1	2.28	4 41.7	2.42	5.2
21	15 36.5	15 29.5	57 10.2	2.19	56 44.6	2.07	5 39.1	2.35	6.2
22	15 22.9	15 16.9	56 20.6	1.93	55 58.4	1.77	6 34.0	2.22	7.2
23	15 11.3	15 6.3	55 38.0	1.62	55 19.6	1.45	7 25.4	2.06	8.2
24	15 1.8	14 57.9	55 3.1	1.29	54 48.6	1.12	8 13.1	1.92	9.2
25	14 54.5	14 51.6	54 36.1	0.96	54 25.5	0.81	8 57.6	1.80	10.2
26	14 49.2	14 47.3	54 16.8	0.66	54 9.8	0.51	9 39.6	1.71	11.2
27	14 45.9	14 44.9	54 4.4	0.38	54 0.7	0.25	10 19.9	1.66	12.2
28	14 44.3	14 44.0	53 58.5	—0.13	53 57.7	—0.01	10 59.5	1.65	13.2
29	14 44.2	14 44.7	53 58.2	+0.10	54 0.1	+0.21	11 39.3	1.68	14.2
30	14 45.5	14 46.7	54 3.2	0.31	54 7.6	0.42	12 20.3	1.74	15.2
31	14 48.3	14 50.2	54 13.3	+0.53	54 20.2	+0.63	13 3.2	1.83	16.2



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 1.					MONDAY 3.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	23 22 29.94	1.7657	N. 0 15 27.7	13.210	0	0 48 13.64	1.8908	N. 10 33 20.0	12.855
1	23 24 15.88	1.7686	0 28 40.2	13.207	1	0 50 3.48	1.8931	10 45 34.2	12.817
2	23 26 1.81	1.7656	0 41 52.6	13.203	2	0 51 53.49	1.8949	10 57 46.1	12.178
3	23 27 47.75	1.7657	0 55 4.7	13.199	3	0 53 43.67	1.8976	11 9 55.6	12.138
4	23 29 33.09	1.7658	1 8 16.5	13.194	4	0 55 34.02	1.8997	11 22 2.7	12.098
5	23 31 19.64	1.7659	1 21 28.0	13.188	5	0 57 24.55	1.9037	11 34 7.4	12.057
6	23 33 5.60	1.7661	1 34 39.1	13.181	6	0 59 15.26	1.9066	11 46 9.6	12.015
7	23 34 51.57	1.7664	1 47 49.8	13.174	7	1 1 6.16	1.9099	11 58 9.2	11.973
8	23 36 37.56	1.7667	2 1 0.0	13.166	8	1 2 57.25	1.9130	12 10 6.3	11.929
9	23 38 23.57	1.7671	2 14 9.7	13.157	9	1 4 48.53	1.9162	12 22 0.7	11.885
10	23 40 9.61	1.7675	2 27 18.9	13.148	10	1 6 40.00	1.9195	12 33 52.5	11.840
11	23 41 55.67	1.7680	2 40 27.5	13.138	11	1 8 31.67	1.9229	12 45 41.5	11.794
12	23 43 41.77	1.7686	2 53 35.5	13.127	12	1 10 23.55	1.9263	12 57 27.8	11.747
13	23 45 27.90	1.7692	3 6 42.8	13.116	13	1 12 15.63	1.9297	13 9 11.2	11.700
14	23 47 14.08	1.7698	3 19 49.4	13.104	14	1 14 7.92	1.9332	13 20 51.8	11.654
15	23 49 0.30	1.7707	3 32 55.3	13.091	15	1 16 0.42	1.9367	13 32 29.5	11.603
16	23 50 46.57	1.7716	3 46 0.3	13.077	16	1 17 53.13	1.9403	13 44 4.2	11.553
17	23 52 32.89	1.7724	3 59 4.5	13.063	17	1 19 46.06	1.9440	13 55 35.9	11.503
18	23 54 19.26	1.7734	4 12 7.9	13.048	18	1 21 39.21	1.9477	14 7 4.5	11.450
19	23 56 5.69	1.7744	4 25 10.3	13.032	19	1 23 32.59	1.9515	14 18 30.0	11.398
20	23 57 52.19	1.7755	4 38 11.7	13.016	20	1 25 26.19	1.9553	14 29 52.3	11.345
21	23 59 38.75	1.7766	4 51 12.1	12.999	21	1 27 20.02	1.9591	14 41 11.4	11.291
22	0 1 25.38	1.7777	5 4 11.5	12.980	22	1 29 14.08	1.9630	14 52 27.2	11.236
23	0 3 12.06	1.7789	N. 5 17 9.7	12.961	23	1 31 8.38	1.9670	N. 15 3 39.7	11.181
SUNDAY 2.					TUESDAY 4.				
0	0 4 58.85	1.7802	N. 5 30 6.8	12.942	0	1 33 2.92	1.9710	N. 15 14 48.9	11.126
1	0 6 45.70	1.7816	5 43 2.7	12.923	1	1 34 57.70	1.9751	15 25 54.6	11.067
2	0 8 32.64	1.7830	5 55 57.4	12.901	2	1 36 52.73	1.9792	15 36 56.9	11.006
3	0 10 19.66	1.7845	6 8 50.8	12.879	3	1 38 48.00	1.9833	15 47 55.6	10.949
4	0 12 6.78	1.7861	6 21 42.9	12.856	4	1 40 43.53	1.9875	15 58 50.8	10.889
5	0 13 53.99	1.7877	6 34 33.6	12.833	5	1 42 39.31	1.9918	16 9 42.3	10.828
6	0 15 41.30	1.7894	6 47 22.9	12.810	6	1 44 35.35	1.9961	16 20 30.2	10.765
7	0 17 28.71	1.7911	7 0 10.8	12.786	7	1 46 31.65	1.9995	16 31 14.3	10.704
8	0 19 16.23	1.7929	7 12 57.2	12.761	8	1 48 28.22	1.9940	16 41 54.7	10.641
9	0 21 3.85	1.7947	7 25 42.0	12.734	9	1 50 25.05	1.9984	16 52 31.2	10.576
10	0 22 51.59	1.7966	7 38 25.3	12.707	10	1 52 22.15	1.9939	17 3 3.8	10.511
11	0 24 39.44	1.7985	7 51 6.9	12.680	11	1 54 19.52	1.9984	17 13 32.5	10.445
12	0 26 27.41	1.8006	8 3 46.9	12.652	12	1 56 17.16	1.9930	17 23 57.2	10.378
13	0 28 15.50	1.8026	8 16 25.2	12.623	13	1 58 15.08	1.9976	17 34 17.8	10.310
14	0 30 3.72	1.8047	8 29 1.7	12.593	14	2 0 13.27	1.9923	17 44 34.4	10.241
15	0 31 52.07	1.8069	8 41 36.4	12.562	15	2 2 11.75	1.9770	17 54 46.8	10.171
16	0 33 40.55	1.8092	8 54 9.2	12.531	16	2 4 10.51	1.9817	18 4 55.0	10.100
17	0 35 29.17	1.8115	9 6 40.2	12.500	17	2 6 9.56	1.9865	18 14 58.9	10.029
18	0 37 17.93	1.8139	9 19 9.2	12.467	18	2 8 8.89	1.9913	18 24 58.5	9.957
19	0 39 6.84	1.8163	9 31 36.2	12.433	19	2 10 8.51	1.9962	18 34 53.7	9.883
20	0 40 55.89	1.8188	9 44 1.2	12.399	20	2 12 8.43	2.0011	18 44 44.5	9.808
21	0 42 45.09	1.8213	9 56 24.1	12.364	21	2 14 8.64	2.0060	18 54 30.8	9.733
22	0 44 34.45	1.8239	10 8 44.9	12.328	22	2 16 9.15	2.0109	19 4 12.5	9.657
23	0 46 23.96	1.8266	10 21 3.6	12.293	23	2 18 9.95	2.0160	19 13 49.6	9.580
24	0 48 13.64	1.8293	N. 10 33 20.0	12.255	24	2 20 11.06	2.0210	N. 19 23 22.1	9.503



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 5.					FRIDAY 7.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	2 20 11.06	2.0210	N.19 23 22.1	9.502	0	4 3 22.60	2.2788	N.25 10 44.5	4.587
1	2 22 12.47	2.0261	19 32 49.8	9.423	1	4 5 39.54	2.2849	25 15 15.9	4.460
2	2 24 14.19	2.0312	19 42 12.8	9.343	2	4 7 56.79	2.2900	25 19 30.7	4.332
3	2 26 16.22	2.0363	19 51 30.9	9.262	3	4 10 14.34	2.2961	25 23 55.8	4.203
4	2 28 18.55	2.0415	20 0 44.2	9.180	4	4 12 32.20	2.3001	25 28 4.1	4.073
5	2 30 21.20	2.0467	20 9 52.5	9.097	5	4 14 50.36	2.3051	25 32 4.6	3.942
6	2 32 24.16	2.0519	20 18 55.8	9.013	6	4 17 8.81	2.3100	25 35 57.2	3.810
7	2 34 27.43	2.0572	20 27 54.1	8.929	7	4 19 27.66	2.3149	25 39 41.8	3.677
8	2 36 31.02	2.0625	20 36 47.2	8.843	8	4 21 46.60	2.3197	25 43 18.5	3.543
9	2 38 34.93	2.0678	20 45 35.2	8.756	9	4 24 5.93	2.3245	25 46 47.1	3.409
10	2 40 39.15	2.0731	20 54 17.9	8.669	10	4 26 25.54	2.3292	25 50 7.6	3.274
11	2 42 43.70	2.0785	21 2 55.3	8.579	11	4 28 45.44	2.3339	25 53 20.0	3.138
12	2 44 48.57	2.0838	21 11 27.3	8.489	12	4 31 5.61	2.3385	25 56 24.2	3.001
13	2 46 53.76	2.0892	21 19 53.9	8.398	13	4 33 26.06	2.3431	25 59 20.1	2.863
14	2 48 59.28	2.0945	21 28 15.1	8.306	14	4 35 46.78	2.3476	26 2 7.8	2.724
15	2 51 5.12	2.1000	21 36 30.7	8.214	15	4 38 7.77	2.3521	26 4 47.1	2.586
16	2 53 11.28	2.1054	21 44 40.8	8.121	16	4 40 29.03	2.3565	26 7 18.0	2.448
17	2 55 17.77	2.1109	21 52 45.2	8.026	17	4 42 50.55	2.3608	26 9 40.4	2.308
18	2 57 24.59	2.1164	22 0 43.9	7.930	18	4 45 12.32	2.3650	26 11 54.4	2.161
19	2 59 31.74	2.1219	22 8 36.8	7.833	19	4 47 34.35	2.3692	26 13 59.8	2.019
20	3 1 39.22	2.1274	22 16 23.8	7.735	20	4 49 56.62	2.3733	26 15 56.7	1.876
21	3 3 47.03	2.1329	22 24 4.9	7.636	21	4 52 19.14	2.3778	26 17 44.9	1.731
22	3 5 55.17	2.1384	22 31 40.1	7.536	22	4 54 41.90	2.3813	26 19 24.4	1.585
23	3 8 3.64	2.1440	N.22 39 9.3	7.436	23	4 57 4.90	2.3859	N.26 20 55.1	1.439
THURSDAY 6.					SATURDAY 8.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	3 10 12.45	2.1495	N.22 46 32.4	7.334	0	4 59 28.13	2.3900	N.26 22 17.1	1.292
1	3 12 21.59	2.1551	22 53 49.4	7.231	1	5 1 51.58	2.3937	26 23 30.2	1.145
2	3 14 31.06	2.1606	23 1 0.1	7.127	2	5 4 15.26	2.3984	26 24 34.5	0.997
3	3 16 40.88	2.1661	23 8 4.6	7.022	3	5 6 39.16	2.4000	26 25 29.9	0.848
4	3 18 50.99	2.1717	23 15 2.7	6.916	4	5 9 3.27	2.4056	26 26 16.3	0.698
5	3 21 1.45	2.1772	23 21 54.5	6.809	5	5 11 27.59	2.4070	26 26 53.7	0.548
6	3 23 12.25	2.1828	23 28 39.8	6.701	6	5 13 52.11	2.4104	26 27 22.1	0.397
7	3 25 23.38	2.1883	23 35 18.6	6.592	7	5 16 16.83	2.4136	26 27 41.4	0.246
8	3 27 34.84	2.1938	23 41 50.9	6.482	8	5 18 41.74	2.4167	26 27 51.6	0.094
9	3 29 46.63	2.1993	23 48 18.6	6.371	9	5 21 6.84	2.4198	26 27 52.6	0.009
10	3 31 58.76	2.2048	23 54 35.5	6.259	10	5 23 32.12	2.4228	26 27 44.5	0.212
11	3 34 11.21	2.2103	24 0 47.7	6.146	11	5 25 57.68	2.4257	26 27 27.1	0.366
12	3 36 23.99	2.2158	24 6 53.0	6.032	12	5 28 23.21	2.4286	26 27 0.5	0.520
13	3 38 37.10	2.2212	24 12 51.5	5.917	13	5 30 49.01	2.4313	26 26 24.7	0.673
14	3 40 50.53	2.2267	24 18 43.0	5.801	14	5 33 14.97	2.4340	26 25 39.5	0.831
15	3 43 4.29	2.2321	24 24 27.6	5.684	15	5 35 41.09	2.4366	26 24 45.0	0.987
16	3 45 18.38	2.2375	24 30 5.1	5.566	16	5 38 7.36	2.4391	26 23 41.1	1.143
17	3 47 32.79	2.2429	24 35 35.5	5.447	17	5 40 33.78	2.4414	26 22 27.9	1.298
18	3 49 47.52	2.2483	24 40 58.8	5.327	18	5 43 0.33	2.4436	26 21 5.2	1.456
19	3 52 2.57	2.2536	24 46 14.8	5.206	19	5 45 27.02	2.4458	26 19 33.1	1.614
20	3 54 17.95	2.2589	24 51 23.5	5.084	20	5 47 53.83	2.4479	26 17 51.5	1.772
21	3 56 33.64	2.2642	24 56 24.9	4.962	21	5 50 20.77	2.4499	26 16 0.4	1.930
22	3 58 49.65	2.2694	25 1 18.9	4.838	22	5 52 47.82	2.4518	26 13 59.9	2.088
23	4 1 5.97	2.2746	25 6 5.5	4.713	23	5 55 14.98	2.4536	26 11 49.8	2.246
24	4 3 22.60	2.2798	N.25 10 44.5	4.587	24	5 57 42.25	2.4553	N.26 9 30.2	2.407



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 9.					TUESDAY 11.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	5 57 42.25	2.4853	N 26 9 30.2	2.407	0	7 55 47.03	2.4238	N 21 10 49.3	2.916
1	6 0 9.69	2.4859	26 7 1.0	2.567	1	7 58 13.00	2.4317	21 0 50.0	10.059
2	6 2 37.08	2.4864	26 4 22.2	2.736	2	8 0 38.84	2.4396	20 50 42.2	10.201
3	6 5 4.03	2.4868	26 1 33.9	2.896	3	8 3 4.55	2.4374	20 40 25.9	10.342
4	6 7 32.26	2.4871	25 58 35.9	2.046	4	8 5 30.13	2.4352	20 30 1.1	10.483
5	6 9 59.96	2.4873	25 55 28.3	2.207	5	8 7 55.57	2.4329	20 19 27.9	10.623
6	6 12 27.74	2.4874	25 52 11.1	2.367	6	8 10 20.88	2.4306	20 8 46.3	10.762
7	6 14 55.59	2.4876	25 48 44.3	2.528	7	8 12 46.05	2.4182	19 57 56.4	10.900
8	6 17 23.49	2.4878	25 45 7.8	2.688	8	8 15 11.07	2.4159	19 46 58.3	11.037
9	6 19 51.45	2.4879	25 41 21.7	2.849	9	8 17 35.95	2.4135	19 35 52.0	11.172
10	6 22 19.45	2.4879	25 37 26.0	4.010	10	8 20 0.69	2.4112	19 24 37.7	11.306
11	6 24 47.49	2.4878	25 33 20.6	4.171	11	8 22 25.29	2.4088	19 13 15.3	11.439
12	6 27 15.57	2.4877	25 29 5.5	4.331	12	8 24 49.74	2.4063	19 1 45.0	11.571
13	6 29 43.68	2.4877	25 24 40.8	4.492	13	8 27 14.04	2.4038	18 50 6.8	11.702
14	6 32 11.81	2.4877	25 20 0.4	4.652	14	8 29 38.19	2.4013	18 38 20.7	11.833
15	6 34 39.96	2.4876	25 15 22.4	4.813	15	8 32 2.19	2.3987	18 26 26.9	11.966
16	6 37 8.13	2.4875	25 10 28.8	4.973	16	8 34 26.03	2.3962	18 14 25.4	12.097
17	6 39 36.30	2.4874	25 5 25.6	5.134	17	8 36 49.72	2.3936	18 2 16.4	12.219
18	6 42 4.48	2.4873	25 0 12.7	5.295	18	8 39 13.26	2.3911	17 49 59.8	12.336
19	6 44 32.65	2.4872	24 54 50.2	5.456	19	8 41 36.65	2.3885	17 37 35.8	12.462
20	6 47 0.82	2.4871	24 49 18.0	5.616	20	8 43 59.89	2.3860	17 25 4.4	12.584
21	6 49 28.97	2.4870	24 43 36.2	5.776	21	8 46 22.97	2.3834	17 12 25.7	12.706
22	6 51 57.11	2.4869	24 37 44.9	5.935	22	8 48 45.00	2.3808	16 59 39.8	12.825
23	6 54 25.22	2.4868	N 24 31 44.0	6.094	23	8 51 8.67	2.3782	N 16 46 46.8	12.943
MONDAY 10.					WEDNESDAY 12.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	6 56 53.31	2.4876	N 24 25 33.6	6.253	0	8 53 31.99	2.3756	N 16 33 46.7	13.060
1	6 59 21.36	2.4872	24 19 13.7	6.412	1	8 55 53.75	2.3731	16 20 39.6	13.175
2	7 1 49.37	2.4868	24 12 44.2	6.570	2	8 58 16.06	2.3705	16 7 25.7	13.289
3	7 4 17.34	2.4865	24 6 5.2	6.728	3	9 0 38.92	2.3680	15 54 5.0	13.401
4	7 6 45.26	2.4860	23 59 16.8	6.886	4	9 3 0.22	2.3654	15 40 37.6	13.512
5	7 9 13.13	2.4840	23 52 19.0	7.043	5	9 5 22.07	2.3629	15 27 3.6	13.623
6	7 11 40.94	2.4830	23 45 11.7	7.200	6	9 7 43.77	2.3604	15 13 23.0	13.730
7	7 14 8.69	2.4820	23 37 55.0	7.356	7	9 10 5.32	2.3580	14 59 36.0	13.836
8	7 16 36.38	2.4809	23 30 29.0	7.512	8	9 12 26.72	2.3555	14 45 42.7	13.941
9	7 19 3.99	2.4798	23 22 53.7	7.667	9	9 14 47.98	2.3530	14 31 43.1	14.045
10	7 21 31.53	2.4783	23 15 9.0	7.822	10	9 17 0.09	2.3505	14 17 37.3	14.147
11	7 23 58.99	2.4770	23 7 15.1	7.976	11	9 19 30.05	2.3481	14 3 25.5	14.247
12	7 26 26.37	2.4756	22 59 11.9	8.129	12	9 21 50.86	2.3457	13 49 7.7	14.346
13	7 28 53.66	2.4741	22 50 59.6	8.282	13	9 24 11.53	2.3434	13 34 44.0	14.443
14	7 31 20.86	2.4725	22 42 38.1	8.434	14	9 26 32.06	2.3410	13 20 14.5	14.538
15	7 33 47.96	2.4709	22 34 7.5	8.586	15	9 28 52.45	2.3387	13 5 39.3	14.633
16	7 36 14.96	2.4692	22 25 27.8	8.737	16	9 31 12.70	2.3364	12 50 58.6	14.734
17	7 38 41.86	2.4675	22 16 39.1	8.887	17	9 33 32.81	2.3341	12 36 12.4	14.815
18	7 41 8.66	2.4657	22 7 41.4	9.036	18	9 35 52.79	2.3318	12 21 20.7	14.904
19	7 43 35.35	2.4638	21 58 34.8	9.184	19	9 38 12.64	2.3296	12 6 23.8	14.992
20	7 46 1.92	2.4619	21 49 19.3	9.332	20	9 40 32.35	2.3274	11 51 21.7	15.078
21	7 48 28.38	2.4600	21 39 54.9	9.479	21	9 42 51.93	2.3252	11 36 14.5	15.161
22	7 50 54.72	2.4580	21 30 21.8	9.626	22	9 45 11.39	2.3232	11 21 2.3	15.242
23	7 53 20.94	2.4560	21 20 39.9	9.771	23	9 47 30.72	2.3211	11 5 45.3	15.324
24	7 55 47.03	2.4538	N 21 10 49.3	9.916	24	9 49 49.92	2.3191	N 10 50 23.5	15.408



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 13.					SATURDAY 15.				
0	9 49 49.92	2.2191	N. 10 50 23.5	16.403	0	11 39 47.76	2.2834	S. 2 23 56.7	16.940
1	9 52 9.00	2.2171	10 34 57.0	16.479	1	11 42 4.90	2.2822	2 40 52.6	16.923
2	9 54 27.97	2.2162	10 19 26.0	16.554	2	11 44 22.10	2.2871	2 57 47.5	16.904
3	9 56 46.83	2.2133	10 3 50.5	16.628	3	11 46 39.35	2.2880	3 14 41.2	16.883
4	9 59 5.57	2.2115	9 48 10.6	16.700	4	11 48 58.66	2.2880	3 31 33.5	16.860
5	10 1 24.20	2.2097	9 32 26.5	16.769	5	11 51 14.03	2.2900	3 48 24.4	16.835
6	10 3 42.73	2.2080	9 16 38.3	16.837	6	11 53 31.46	2.2911	4 5 13.7	16.808
7	10 6 1.16	2.2063	9 0 46.1	16.903	7	11 55 48.96	2.2923	4 22 1.4	16.779
8	10 8 19.48	2.2046	8 44 49.9	16.967	8	11 58 6.54	2.2936	4 38 47.2	16.748
9	10 10 37.70	2.2030	8 28 49.9	16.030	9	12 0 24.19	2.2949	4 55 31.1	16.714
10	10 12 55.83	2.2014	8 12 46.3	16.091	10	12 2 41.92	2.2963	5 12 12.9	16.679
11	10 15 13.87	2.2000	7 56 39.1	16.149	11	12 4 59.74	2.2977	5 28 53.6	16.643
12	10 17 31.82	2.2084	7 40 28.4	16.208	12	12 7 17.64	2.2992	5 45 30.0	16.603
13	10 19 49.68	2.2070	7 24 14.4	16.261	13	12 9 35.63	2.3007	6 2 5.0	16.562
14	10 22 7.46	2.2056	7 7 57.1	16.314	14	12 11 53.72	2.3023	6 18 37.5	16.518
15	10 24 25.16	2.2043	6 51 36.7	16.368	15	12 14 11.90	2.3039	6 35 7.3	16.473
16	10 26 42.78	2.2031	6 35 13.3	16.414	16	12 16 30.18	2.3056	6 51 34.3	16.428
17	10 29 0.33	2.2019	6 18 47.0	16.461	17	12 18 48.57	2.3073	7 7 58.4	16.377
18	10 31 17.80	2.2008	6 2 18.0	16.506	18	12 21 7.06	2.3091	7 24 19.5	16.326
19	10 33 35.21	2.2097	5 45 46.3	16.550	19	12 23 25.67	2.3110	7 40 37.5	16.273
20	10 35 52.56	2.2087	5 29 12.0	16.592	20	12 25 44.39	2.3129	7 56 52.2	16.218
21	10 38 9.85	2.2077	5 12 35.3	16.631	21	12 28 3.23	2.3149	8 13 3.5	16.161
22	10 40 27.08	2.2068	4 55 56.3	16.668	22	12 30 22.18	2.3169	8 29 11.4	16.102
23	10 42 44.26	2.2059	N. 4 39 15.1	16.704	23	12 32 41.26	2.3190	S. 8 45 15.7	16.041
FRIDAY 14.					SUNDAY 16.				
0	10 45 1.39	2.2051	N. 4 22 31.8	16.738	0	12 35 0.46	2.3211	S. 9 1 16.3	16.978
1	10 47 18.48	2.2044	4 5 46.6	16.769	1	12 37 19.79	2.3222	9 17 13.0	16.913
2	10 49 35.52	2.2036	3 48 59.5	16.799	2	12 39 39.25	2.3234	9 33 5.8	16.846
3	10 51 52.53	2.2028	3 32 10.7	16.827	3	12 41 58.85	2.3277	9 48 54.5	16.778
4	10 54 9.51	2.2027	3 15 20.3	16.853	4	12 44 18.58	2.3300	10 4 39.1	16.708
5	10 56 26.46	2.2022	2 58 28.4	16.876	5	12 46 38.45	2.3324	10 20 19.4	16.635
6	10 58 43.38	2.2018	2 41 35.2	16.897	6	12 48 58.47	2.3348	10 35 55.3	16.560
7	11 1 0.27	2.2014	2 24 40.8	16.917	7	12 51 18.63	2.3373	10 51 26.7	16.484
8	11 3 17.15	2.2011	2 7 45.2	16.935	8	12 53 38.93	2.3397	11 6 53.4	16.406
9	11 5 34.01	2.2009	1 50 48.6	16.950	9	12 55 59.38	2.3422	11 22 15.4	16.327
10	11 7 50.86	2.2008	1 33 51.2	16.963	10	12 58 19.99	2.3448	11 37 32.6	16.246
11	11 10 7.71	2.2007	1 16 53.0	16.975	11	13 0 40.75	2.3474	11 52 44.9	16.162
12	11 12 24.55	2.2007	0 59 54.2	16.985	12	13 3 1.67	2.3500	12 7 52.1	16.077
13	11 14 41.39	2.2007	0 42 54.8	16.992	13	13 5 22.76	2.3526	12 22 54.1	14.990
14	11 16 58.24	2.2008	0 25 55.1	16.997	14	13 7 43.98	2.3552	12 37 50.9	14.901
15	11 19 15.09	2.2010	N. 0 8 55.1	17.001	15	13 10 5.37	2.3579	12 52 42.3	14.810
16	11 21 31.96	2.2012	S. 0 8 5.0	17.003	16	13 12 26.93	2.3606	13 7 28.1	14.717
17	11 23 48.84	2.2015	0 25 5.1	17.002	17	13 14 48.65	2.3634	13 22 8.3	14.623
18	11 26 5.74	2.2018	0 42 5.2	16.999	18	13 17 10.54	2.3661	13 36 42.9	14.527
19	11 28 22.66	2.2022	0 59 5.1	16.996	19	13 19 32.59	2.3689	13 51 11.7	14.430
20	11 30 39.61	2.2027	1 16 4.6	16.993	20	13 21 54.81	2.3717	14 5 34.5	14.331
21	11 32 56.59	2.2033	1 33 3.6	16.979	21	13 24 17.20	2.3746	14 19 51.3	14.229
22	11 35 13.61	2.2039	1 50 2.1	16.968	22	13 26 39.76	2.3776	14 34 2.0	14.126
23	11 37 30.66	2.2046	2 6 59.8	16.956	23	13 29 2.50	2.3804	14 48 6.5	14.022
24	11 39 47.76	2.2054	S. 2 23 56.7	16.940	24	13 31 25.41	2.3833	S. 15 2 4.6	13.916



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 17.					WEDNESDAY 19.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	13 31 25.41	2.3833	S. 15 2 4.6	13.916	0	15 28 57.97	2.5005	S. 23 41 18.2	7.381
1	13 33 48.49	2.3862	15 15 56.3	13.908	1	15 31 28.04	2.5017	23 48 30.2	7.130
2	13 36 11.75	2.3891	15 29 41.6	13.699	2	15 33 58.18	2.5028	23 55 32.6	6.969
3	13 38 35.19	2.3921	15 43 20.3	13.589	3	15 36 28.38	2.5038	24 2 25.3	6.797
4	13 40 58.80	2.3950	15 56 52.3	13.477	4	15 38 58.64	2.5047	24 9 8.2	6.634
5	13 43 22.59	2.3979	16 10 17.5	13.362	5	15 41 28.95	2.5056	24 15 41.4	6.471
6	13 45 46.55	2.4008	16 23 35.8	13.246	6	15 43 59.30	2.5062	24 22 4.8	6.308
7	13 48 10.69	2.4038	16 36 47.1	13.130	7	15 46 29.70	2.5069	24 28 18.4	6.144
8	13 50 35.01	2.4067	16 49 51.4	13.012	8	15 49 0.13	2.5075	24 34 22.1	5.980
9	13 52 59.51	2.4097	17 2 48.5	12.892	9	15 51 30.59	2.5079	24 40 16.0	5.816
10	13 55 24.18	2.4126	17 15 38.4	12.771	10	15 54 1.08	2.5082	24 46 0.0	5.652
11	13 57 49.03	2.4156	17 28 21.0	12.648	11	15 56 31.58	2.5085	24 51 34.2	5.487
12	14 0 14.05	2.4185	17 40 56.3	12.524	12	15 59 2.10	2.5087	24 56 58.4	5.322
13	14 2 39.25	2.4214	17 53 23.8	12.398	13	16 1 32.62	2.5087	25 2 12.7	5.156
14	14 5 4.62	2.4243	18 5 43.9	12.371	14	16 4 3.15	2.5087	25 7 17.1	4.991
15	14 7 30.17	2.4272	18 17 56.3	12.142	15	16 6 33.67	2.5086	25 12 11.6	4.826
16	14 9 55.89	2.4301	18 30 0.9	12.012	16	16 9 4.17	2.5082	25 16 56.1	4.659
17	14 12 21.78	2.4329	18 41 57.7	11.881	17	16 11 34.66	2.5079	25 21 30.7	4.492
18	14 14 47.85	2.4358	18 53 46.6	11.748	18	16 14 5.12	2.5075	25 25 55.3	4.327
19	14 17 14.08	2.4386	19 5 27.5	11.614	19	16 16 35.55	2.5069	25 30 10.0	4.162
20	14 19 40.48	2.4414	19 17 0.3	11.479	20	16 19 5.95	2.5062	25 34 14.8	3.996
21	14 22 7.05	2.4442	19 28 25.0	11.343	21	16 21 36.30	2.5054	25 38 9.6	3.831
22	14 24 33.78	2.4469	19 39 41.4	11.206	22	16 24 6.60	2.5045	25 41 54.5	3.665
23	14 27 0.67	2.4495	S. 19 50 49.6	11.067	23	16 26 36.85	2.5036	S. 25 45 29.5	3.500
TUESDAY 18.					THURSDAY 20.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	14 29 27.72	2.4522	S. 20 1 49.4	10.927	0	16 29 7.04	2.5026	S. 25 48 54.5	3.334
1	14 31 54.93	2.4548	20 12 40.8	10.786	1	16 31 37.16	2.5014	25 52 9.6	3.169
2	14 34 22.30	2.4574	20 23 23.7	10.644	2	16 34 7.21	2.5001	25 55 14.8	3.008
3	14 36 49.82	2.4600	20 33 58.0	10.500	3	16 36 37.18	2.4988	25 58 10.1	2.838
4	14 39 17.50	2.4625	20 44 23.7	10.356	4	16 39 7.06	2.4975	26 0 55.4	2.673
5	14 41 45.32	2.4649	20 54 40.7	10.211	5	16 41 36.85	2.4957	26 3 30.9	2.509
6	14 44 13.29	2.4673	21 4 49.0	10.065	6	16 44 6.54	2.4940	26 5 56.5	2.346
7	14 46 41.40	2.4697	21 14 48.4	9.917	7	16 46 36.13	2.4922	26 8 12.3	2.181
8	14 49 9.66	2.4720	21 24 39.0	9.768	8	16 49 5.60	2.4908	26 10 18.2	2.017
9	14 51 38.05	2.4743	21 34 20.6	9.619	9	16 51 34.96	2.4892	26 12 14.3	1.853
10	14 54 6.58	2.4765	21 43 53.3	9.469	10	16 54 4.19	2.4880	26 14 0.6	1.689
11	14 56 35.24	2.4787	21 53 16.9	9.317	11	16 56 33.29	2.4868	26 15 37.1	1.527
12	14 59 4.03	2.4808	22 2 31.4	9.166	12	16 59 2.25	2.4855	26 17 3.9	1.363
13	15 1 32.94	2.4828	22 11 36.8	9.012	13	17 1 31.07	2.4791	26 18 20.9	1.200
14	15 4 1.97	2.4848	22 20 32.9	8.856	14	17 3 59.74	2.4766	26 19 28.3	1.032
15	15 6 31.12	2.4867	22 29 19.8	8.704	15	17 6 28.25	2.4739	26 20 26.0	0.862
16	15 9 0.38	2.4886	22 37 57.4	8.549	16	17 8 56.61	2.4712	26 21 14.1	0.723
17	15 11 29.75	2.4903	22 46 25.6	8.393	17	17 11 24.80	2.4684	26 21 52.6	0.563
18	15 13 59.22	2.4920	22 54 44.5	8.236	18	17 13 52.82	2.4656	26 22 21.5	0.409
19	15 16 28.79	2.4936	23 2 53.9	8.078	19	17 16 20.66	2.4624	26 22 40.9	0.244
20	15 18 58.45	2.4951	23 10 53.9	7.920	20	17 18 48.31	2.4598	26 22 50.8	0.086
21	15 21 28.21	2.4966	23 18 44.3	7.761	21	17 21 15.77	2.4561	26 22 51.2	0.071
22	15 23 58.05	2.4980	23 26 25.2	7.602	22	17 23 43.04	2.4526	26 22 42.2	0.228
23	15 26 27.97	2.4993	23 33 56.5	7.442	23	17 26 10.11	2.4494	26 22 23.8	0.384
24	15 28 57.97	2.5005	S. 23 41 18.2	7.281	24	17 28 36.97	2.4459	S. 26 21 56.1	0.540



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 21.					SUNDAY 23.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	17 28 36.97	2.4459	S. 26 21 56.1	0.840	0	19 20 38.62	2.2034	S. 23 13 10.5	6.946
1	17 31 3.62	2.4423	26 21 19.0	0.865	1	19 22 50.65	2.1975	23 6 10.5	7.054
2	17 33 30.05	2.4386	26 20 32.7	0.849	2	19 25 2.32	2.1917	22 59 4.0	7.161
3	17 35 56.26	2.4349	26 19 37.2	1.002	3	19 27 13.64	2.1858	22 51 51.1	7.267
4	17 38 22.24	2.4311	26 18 32.5	1.164	4	19 29 24.61	2.1800	22 44 31.9	7.372
5	17 40 47.98	2.4271	26 17 18.7	1.206	5	19 31 35.23	2.1741	22 37 6.4	7.475
6	17 43 13.49	2.4231	26 15 55.8	1.457	6	19 33 45.50	2.1683	22 29 34.8	7.577
7	17 45 38.75	2.4190	26 14 23.8	1.608	7	19 35 55.42	2.1624	22 21 57.1	7.678
8	17 48 3.77	2.4148	26 12 42.8	1.768	8	19 38 4.99	2.1566	22 14 13.3	7.779
9	17 50 28.53	2.4106	26 10 52.9	1.906	9	19 40 14.21	2.1507	22 6 23.5	7.879
10	17 52 53.04	2.4063	26 8 54.0	2.064	10	19 42 23.08	2.1449	21 58 27.8	7.978
11	17 55 17.28	2.4019	26 6 46.3	2.201	11	19 44 31.60	2.1391	21 50 26.2	8.075
12	17 57 41.26	2.3973	26 4 29.9	2.347	12	19 46 39.77	2.1333	21 42 18.8	8.171
13	18 0 4.96	2.3927	26 2 4.7	2.498	13	19 48 47.60	2.1275	21 34 5.7	8.266
14	18 2 28.39	2.3881	25 59 30.8	2.637	14	19 50 55.08	2.1218	21 25 46.9	8.360
15	18 4 51.54	2.3835	25 56 48.3	2.780	15	19 53 2.22	2.1161	21 17 22.5	8.453
16	18 7 14.41	2.3788	25 53 57.9	2.922	16	19 55 9.01	2.1104	21 8 52.6	8.545
17	18 9 36.99	2.3739	25 50 57.6	3.063	17	19 57 15.46	2.1047	21 0 17.2	8.635
18	18 11 59.28	2.3690	25 47 49.5	3.204	18	19 59 21.57	2.0990	20 51 36.4	8.724
19	18 14 21.27	2.3641	25 44 33.0	3.344	19	20 1 27.35	2.0934	20 42 50.3	8.813
20	18 16 42.97	2.3591	25 41 8.2	3.483	20	20 3 32.79	2.0878	20 33 58.9	8.901
21	18 19 4.36	2.3540	25 37 35.1	3.621	21	20 5 37.89	2.0822	20 25 2.3	8.987
22	18 21 25.45	2.3489	25 33 53.7	3.758	22	20 7 42.66	2.0767	20 16 0.5	9.072
23	18 23 46.24	2.3438	S. 25 30 4.1	3.894	23	20 9 47.10	2.0713	S. 20 6 53.6	9.157
SATURDAY 22.					MONDAY 24.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	18 26 6.71	2.3386	S. 25 26 6.5	4.029	0	20 11 51.20	2.0667	S. 19 57 41.6	9.240
1	18 28 26.87	2.3334	25 22 0.8	4.162	1	20 13 54.07	2.0602	19 48 24.7	9.322
2	18 30 46.71	2.3281	25 17 47.1	4.294	2	20 15 58.42	2.0547	19 39 2.9	9.403
3	18 33 6.23	2.3227	25 13 25.5	4.426	3	20 18 1.54	2.0493	19 29 36.2	9.484
4	18 35 25.43	2.3173	25 8 56.0	4.567	4	20 20 4.34	2.0439	19 20 4.8	9.564
5	18 37 44.30	2.3118	25 4 18.7	4.697	5	20 22 6.82	2.0386	19 10 28.7	9.642
6	18 40 2.84	2.3063	24 59 33.6	4.816	6	20 24 8.97	2.0333	19 0 47.8	9.719
7	18 42 21.06	2.3008	24 54 40.9	4.943	7	20 26 10.81	2.0280	18 51 2.3	9.796
8	18 44 38.94	2.2953	24 49 40.5	5.069	8	20 28 12.33	2.0227	18 41 12.3	9.871
9	18 46 56.49	2.2897	24 44 32.6	5.196	9	20 30 13.54	2.0175	18 31 17.8	9.945
10	18 49 13.70	2.2841	24 39 17.1	5.320	10	20 32 14.43	2.0124	18 21 18.9	10.018
11	18 51 30.57	2.2786	24 33 54.2	5.443	11	20 34 15.02	2.0073	18 11 15.6	10.091
12	18 53 47.11	2.2730	24 28 24.0	5.565	12	20 36 15.30	2.0022	18 1 8.0	10.163
13	18 56 3.31	2.2671	24 22 46.5	5.686	13	20 38 15.28	1.9972	17 50 56.1	10.233
14	18 58 19.16	2.2614	24 17 1.7	5.806	14	20 40 14.96	1.9922	17 40 40.1	10.302
15	19 0 34.67	2.2556	24 11 9.7	5.926	15	20 42 14.34	1.9873	17 30 19.9	10.370
16	19 2 49.83	2.2499	24 5 10.7	6.043	16	20 44 13.43	1.9824	17 19 55.7	10.437
17	19 5 4.65	2.2441	23 59 4.6	6.159	17	20 46 12.23	1.9775	17 9 27.4	10.504
18	19 7 19.12	2.2383	23 52 51.6	6.275	18	20 48 10.73	1.9727	16 58 55.2	10.570
19	19 9 33.24	2.2325	23 46 31.6	6.390	19	20 50 8.95	1.9679	16 48 19.1	10.634
20	19 11 47.02	2.2267	23 40 4.8	6.504	20	20 52 6.88	1.9632	16 37 39.1	10.698
21	19 14 0.45	2.2209	23 33 31.2	6.616	21	20 54 4.53	1.9586	16 26 55.3	10.761
22	19 16 13.52	2.2151	23 26 50.9	6.727	22	20 56 1.91	1.9540	16 16 7.8	10.823
23	19 18 26.24	2.2092	23 20 4.0	6.837	23	20 57 59.01	1.9494	16 5 16.6	10.884
24	19 20 38.62	2.2034	S. 23 13 10.5	6.946	24	20 59 55.84	1.9449	S. 15 54 21.7	10.944



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 25.					THURSDAY 27.				
	<i>h. m. s.</i>	<i>S.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>S.</i>	<i>° ' "</i>	<i>"</i>
0	20 59 55.84	1.9449	S. 15 54 21.7	10.944	0	22 29 6.49	1.7980	S. 6 16 21.4	12.936
1	21 1 52.40	1.9404	15 43 23.3	11.002	1	22 30 54.02	1.7913	6 3 31.1	12.946
2	21 3 48.69	1.9360	15 32 21.4	11.060	2	22 32 41.45	1.7897	5 50 39.6	12.988
3	21 5 44.72	1.9316	15 21 16.0	11.118	3	22 34 28.78	1.7881	5 37 46.9	12.987
4	21 7 40.48	1.9278	15 10 7.2	11.176	4	22 36 16.02	1.7866	5 24 53.2	12.905
5	21 9 35.99	1.9230	14 58 55.0	11.230	5	22 38 3.17	1.7861	5 11 58.4	12.922
6	21 11 31.24	1.9186	14 47 39.6	11.284	6	22 39 50.23	1.7887	4 59 2.6	12.936
7	21 13 26.24	1.9147	14 36 20.9	11.337	7	22 41 37.21	1.7893	4 46 5.8	12.984
8	21 15 21.00	1.9106	14 24 59.1	11.390	8	22 43 24.10	1.7810	4 33 8.1	12.960
9	21 17 15.51	1.9065	14 13 34.1	11.443	9	22 45 10.92	1.7798	4 20 9.5	12.988
10	21 19 9.77	1.9025	14 2 6.0	11.498	10	22 46 57.67	1.7786	4 7 10.1	12.996
11	21 21 3.80	1.8985	13 50 34.9	11.548	11	22 48 44.35	1.7775	3 54 9.9	13.009
12	21 22 57.59	1.8946	13 39 0.8	11.592	12	22 50 30.97	1.7768	3 41 9.0	12.921
13	21 24 51.15	1.8908	13 27 23.8	11.641	13	22 52 17.53	1.7765	3 28 7.3	12.933
14	21 26 44.49	1.8870	13 15 43.9	11.689	14	22 54 4.03	1.7746	3 15 5.0	12.944
15	21 28 37.60	1.8833	13 4 1.1	11.736	15	22 55 50.48	1.7737	3 2 2.1	12.953
16	21 30 30.48	1.8796	12 52 15.0	11.782	16	22 57 36.87	1.7729	2 48 58.6	12.962
17	21 32 23.15	1.8760	12 40 27.3	11.827	17	22 59 23.22	1.7721	2 35 54.6	12.971
18	21 34 15.60	1.8724	12 28 36.4	11.871	18	23 1 9.52	1.7714	2 22 50.1	12.979
19	21 36 7.84	1.8689	12 16 42.8	11.914	19	23 2 55.79	1.7708	2 9 45.1	12.986
20	21 37 59.87	1.8655	12 4 46.7	11.957	20	23 4 42.02	1.7703	1 56 39.8	12.992
21	21 39 51.70	1.8621	11 52 48.0	11.999	21	23 6 28.22	1.7697	1 43 34.1	12.998
22	21 41 43.33	1.8588	11 40 46.8	12.040	22	23 8 14.39	1.7692	1 30 28.1	12.100
23	21 43 34.76	1.8555	S. 11 28 43.2	12.080	23	23 10 0.53	1.7686	S. 1 17 21.8	12.107
WEDNESDAY 26.					FRIDAY 28.				
	<i>h. m. s.</i>	<i>S.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>S.</i>	<i>° ' "</i>	<i>"</i>
0	21 45 25.99	1.8522	S. 11 16 37.2	12.119	0	23 11 46.65	1.7680	S. 1 4 15.3	12.110
1	21 47 17.03	1.8492	11 4 28.8	12.168	1	23 13 32.75	1.7682	0 51 8.6	12.113
2	21 49 7.89	1.8461	10 52 18.2	12.196	2	23 15 18.84	1.7680	0 38 1.7	12.115
3	21 50 58.56	1.8430	10 40 5.3	12.222	3	23 17 4.92	1.7679	0 24 54.8	12.116
4	21 52 49.05	1.8400	10 27 50.3	12.268	4	23 18 51.00	1.7678	S. 0 11 47.8	12.117
5	21 54 39.36	1.8371	10 15 33.2	12.303	5	23 20 37.07	1.7678	N. 0 1 19.2	12.117
6	21 56 29.50	1.8343	10 3 13.9	12.338	6	23 22 23.14	1.7679	0 14 26.2	12.116
7	21 58 19.47	1.8316	9 50 52.6	12.372	7	23 24 9.22	1.7680	0 27 33.1	12.114
8	22 0 9.28	1.8288	9 38 29.2	12.405	8	23 25 55.30	1.7682	0 40 39.9	12.111
9	22 1 58.93	1.8261	9 26 3.9	12.437	9	23 27 41.40	1.7684	0 53 46.5	12.108
10	22 3 48.41	1.8235	9 13 36.7	12.469	10	23 29 27.51	1.7687	1 6 52.9	12.104
11	22 5 37.74	1.8209	9 1 7.7	12.499	11	23 31 13.64	1.7690	1 19 59.0	12.100
12	22 7 26.91	1.8184	8 48 36.8	12.529	12	23 32 59.79	1.7694	1 33 4.9	12.095
13	22 9 15.94	1.8159	8 36 4.2	12.558	13	23 34 45.97	1.7698	1 46 10.4	12.090
14	22 11 4.82	1.8135	8 23 29.8	12.586	14	23 36 32.17	1.7703	1 59 15.6	12.085
15	22 12 53.56	1.8112	8 10 53.8	12.614	15	23 38 18.41	1.7709	2 12 20.3	12.075
16	22 14 42.17	1.8090	7 58 16.1	12.641	16	23 40 4.68	1.7715	2 25 24.6	12.067
17	22 16 30.65	1.8068	7 45 36.8	12.667	17	23 41 50.99	1.7722	2 38 28.4	12.066
18	22 18 18.99	1.8046	7 32 56.0	12.692	18	23 43 37.35	1.7726	2 51 31.6	12.048
19	22 20 7.20	1.8025	7 20 13.7	12.717	19	23 45 23.76	1.7728	3 4 34.2	12.086
20	22 21 55.39	1.8005	7 7 30.0	12.741	20	23 47 10.21	1.7747	3 17 36.2	12.037
21	22 23 43.26	1.7985	6 54 44.8	12.764	21	23 48 56.72	1.7756	3 30 37.5	12.016
22	22 25 31.11	1.7966	6 41 58.3	12.786	22	23 50 43.28	1.7766	3 43 38.1	12.004
23	22 27 18.85	1.7948	6 29 10.5	12.807	23	23 52 29.91	1.7771	3 56 38.0	12.991
24	22 29 6.49	1.7930	S. 6 16 21.4	12.828	24	23 54 16.60	1.7786	N. 4 9 37.0	12.977



GREENWICH MEAN TIME.									
THE MOON'S RIGHT ASCENSION AND DECLINATION.									
Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 29.					SUNDAY 30.				
0	h. m. s. 23 54 16.00	s. 1.7798	N. ° ' " 4 9 37.0	" 12.977	0	h. m. s. 0 37 25.47	s. 1.8228	N. ° ' " 9 15 11.9	" 12.415
1	23 56 3.36	1.7799	4 22 35.2	12.982	1	0 39 14.88	1.8248	9 27 35.9	12.382
2	23 57 50.19	1.7811	4 35 32.4	12.946	2	0 41 4.45	1.9274	9 39 57.8	12.348
3	23 59 37.10	1.7834	4 48 28.7	12.980	3	0 42 54.17	1.8800	9 52 17.7	12.314
4	0 1 24.08	1.7887	5 1 24.0	12.913	4	0 44 44.05	1.8827	10 4 35.5	12.279
5	0 3 11.15	1.7861	5 14 18.3	12.896	5	0 46 34.09	1.8844	10 16 51.1	12.242
6	0 4 58.30	1.7886	5 27 11.5	12.878	6	0 48 24.30	1.8862	10 29 4.5	12.205
7	0 6 45.54	1.7881	5 40 3.5	12.868	7	0 50 14.67	1.8410	10 41 15.7	12.168
8	0 8 32.87	1.7897	5 52 54.4	12.838	8	0 52 5.22	1.8489	10 53 24.6	12.129
9	0 10 20.29	1.7913	6 5 44.1	12.818	9	0 53 55.94	1.8468	11 5 31.1	12.089
10	0 12 7.82	1.7980	6 18 32.5	12.797	10	0 55 46.84	1.8498	11 17 35.3	12.048
11	0 13 55.45	1.7946	6 31 19.6	12.774	11	0 57 37.92	1.8529	11 29 37.0	12.007
12	0 15 43.19	1.7986	6 44 5.3	12.761	12	0 59 29.19	1.8600	11 41 36.2	11.965
13	0 17 31.03	1.7984	6 56 49.6	12.737	13	1 1 20.64	1.8691	11 53 32.8	11.922
14	0 19 18.99	1.8008	7 9 32.5	12.708	14	1 3 12.28	1.8623	12 5 26.9	11.879
15	0 21 7.07	1.8022	7 22 13.9	12.678	15	1 5 4.11	1.8665	12 17 18.3	11.835
16	0 22 55.26	1.8043	7 34 53.8	12.632	16	1 6 56.14	1.8688	12 29 7.1	11.790
17	0 24 43.57	1.8068	7 47 32.1	12.626	17	1 8 48.36	1.8721	12 40 53.1	11.743
18	0 26 32.01	1.8084	8 0 8.8	12.598	18	1 10 40.79	1.8765	12 52 36.3	11.695
19	0 28 20.58	1.8106	8 12 43.8	12.569	19	1 12 33.42	1.8789	13 4 16.6	11.648
20	0 30 9.28	1.8126	8 25 17.0	12.539	20	1 14 26.26	1.8824	13 15 54.1	11.599
21	0 31 58.12	1.8161	8 37 48.5	12.510	21	1 16 19.31	1.8860	13 27 28.6	11.550
22	0 33 47.09	1.8174	8 50 18.2	12.480	22	1 18 12.57	1.8896	13 39 0.1	11.500
23	0 35 36.21	1.8198	9 2 46.0	12.448	23	1 20 6.05	1.8932	13 50 28.6	11.449
24	0 37 25.47	1.8223	N. 9 15 11.9	12.415	24	1 21 59.75	1.8968	N.14 1 54.0	11.397

PHASES OF THE MOON.									
					Day. h. m.				
☾ Last Quarter,					7 23 7.1				
● New Moon,					14 18 9.5				
☽ First Quarter,					21 11 24.9				
○ Full Moon,					29 13 39.8				
					Day. h.				
☾ Apogee,					1 11.9				
☾ Perigee,					14 20.4				
☾ Apogee,					28 13.2				



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
1	Antares W.	103 54 49	3009	105 23 36	3071	106 52 21	3072	108 21 5	3073
	Mars W.	61 29 4	3155	62 56 7	3156	64 23 9	3156	65 50 8	3159
	$\alpha$ Aquilæ W.	55 1 17	4013	56 12 44	3983	57 24 40	3963	58 37 6	3927
	$\alpha$ Arietis E.	44 16 41	3102	42 48 34	3105	41 20 31	3108	39 52 31	3111
	Aldebaran E.	76 50 29	3136	75 23 2	3137	73 55 37	3139	72 28 15	3142
	Venus E.	125 16 42	3341	123 53 18	3342	122 29 55	3343	121 6 33	3344
2	Mars W.	73 4 52	3162	74 31 47	3161	75 58 43	3160	77 25 40	3160
	$\alpha$ Aquilæ W.	64 45 25	3819	66 0 8	3801	67 15 9	3785	68 30 27	3768
	Fomalhaut W.	40 8 6	4110	41 15 58	4049	42 26 49	3995	43 38 34	3943
	$\alpha$ Arietis E.	32 33 33	3129	31 5 59	3123	29 38 30	3139	28 11 8	3146
	Aldebaran E.	65 11 59	3149	63 44 49	3151	62 17 41	3153	60 50 35	3154
	Pollux E.	107 13 11	3097	105 44 58	3098	104 16 44	3096	102 48 29	3095
3	Venus E.	114 9 51	3345	112 46 31	3345	111 23 11	3344	109 59 50	3343
	Mars W.	84 40 37	3154	86 7 41	3152	87 34 48	3149	89 1 58	3147
	$\alpha$ Aquilæ W.	74 50 43	3705	76 7 25	3694	77 24 18	3684	78 41 22	3675
	Fomalhaut W.	49 48 31	3750	51 4 25	3730	52 20 51	3692	53 37 47	3664
	$\alpha$ Pegasi W.	27 12 2	3917	28 25 5	3896	29 39 30	3765	30 55 9	3704
	Aldebaran E.	53 35 29	3160	52 8 32	3163	50 41 38	3164	49 14 46	3163
4	Pollux E.	95 26 49	3066	93 58 22	3062	92 29 51	3079	91 1 16	3078
	Venus E.	103 2 47	3336	101 39 17	3333	100 15 44	3332	98 52 9	3328
	Jupiter E.	118 54 30	3143	117 27 12	3139	115 59 50	3138	114 32 26	3133
	Mars W.	96 18 41	3130	97 46 14	3125	99 13 53	3120	100 41 38	3115
	$\alpha$ Aquilæ W.	85 9 4	3634	86 27 2	3627	87 45 7	3621	89 3 19	3615
	Fomalhaut W.	60 9 7	3452	61 28 34	3433	62 48 22	3415	64 8 30	3407
5	$\alpha$ Pegasi W.	37 27 36	3490	38 48 22	3447	40 9 45	3419	41 31 40	3389
	Aldebaran E.	42 1 3	3179	40 34 29	3183	39 7 59	3188	37 41 36	3198
	Pollux E.	83 37 25	3058	82 8 24	3053	80 39 17	3049	79 10 5	3043
	Venus E.	91 53 17	3310	90 29 17	3306	89 5 12	3300	87 41 1	3294
	Jupiter E.	107 14 16	3114	105 46 23	3109	104 18 24	3103	102 50 18	3097
	Mars W.	108 2 1	3088	109 30 28	3078	110 59 4	3070	112 27 50	3064
6	$\alpha$ Aquilæ W.	95 35 48	3690	96 54 33	3667	98 13 22	3663	99 32 15	3650
	Fomalhaut W.	70 53 53	3416	72 15 51	3402	73 38 5	3398	75 0 35	3373
	$\alpha$ Pegasi W.	48 28 46	3278	49 53 29	3253	51 18 36	3234	52 44 5	3215
	Pollux E.	71 42 14	3012	70 12 16	3005	68 42 9	2997	67 11 53	2990
	Venus E.	80 38 25	3264	79 13 31	3256	77 48 28	3248	76 23 16	3240
	Jupiter E.	95 27 57	3054	93 59 3	3056	92 30 0	3048	91 0 47	3039
7	SUN E.	123 46 40	3392	122 23 40	3388	121 0 30	3345	119 37 10	3335
	Fomalhaut W.	81 57 8	3306	83 21 13	3292	84 45 34	3281	86 10 8	3268
	$\alpha$ Pegasi W.	59 56 53	3127	61 24 30	3111	62 52 26	3096	64 20 42	3079
	$\alpha$ Arietis W.	16 19 12	3100	17 47 22	3065	19 16 15	3051	20 45 49	3038
	Pollux E.	59 38 2	2946	58 6 41	2938	56 35 10	2928	55 3 25	2918
	Venus E.	69 14 40	3198	67 48 23	3183	66 21 53	3172	64 55 10	3161
7	Jupiter E.	83 31 55	2992	82 1 32	2981	80 30 56	2969	79 0 5	2958
	SUN E.	112 37 41	3238	111 13 10	3272	109 48 26	3260	108 23 28	3247
	Fomalhaut W.	93 16 41	3208	94 42 43	3194	96 8 59	3183	97 35 28	3172
	$\alpha$ Pegasi W.	71 47 3	2998	73 17 21	2981	74 47 58	2965	76 18 55	2947
7	$\alpha$ Arietis W.	28 21 50	2987	29 54 26	2969	31 27 25	2948	33 0 51	2931
	Pollux E.	47 21 27	2953	45 48 21	2932	44 15 1	2941	42 41 26	2931
	Venus E.	57 38 3	3098	56 9 51	3085	54 41 23	3071	53 12 38	3057



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Antares W.	109 49 48	3073	111 18 30	3073	112 47 12	3074	114 15 53	3074
	Mars W.	67 17 6	3160	68 44 3	3160	70 11 0	3161	71 37 56	3161
	$\alpha$ Aquilæ W.	59 49 58	3002	61 3 16	3079	62 16 57	3086	63 31 1	3034
	$\alpha$ Arietis E.	38 24 35	3114	36 56 43	3119	35 28 56	3122	34 1 13	3124
	Aldebaran E.	71 0 56	3143	69 33 39	3144	68 6 23	3147	66 39 10	3148
	Venus E.	119 43 12	3344	118 19 51	3345	116 56 31	3345	115 33 11	3345
2	Mars W.	78 52 37	3168	80 19 35	3168	81 46 34	3167	83 13 35	3166
	$\alpha$ Aquilæ W.	69 46 2	3765	71 1 51	3741	72 17 55	3727	73 34 13	3716
	Fomalhaut W.	44 51 8	3000	46 4 28	3057	47 18 31	3030	48 33 12	3784
	$\alpha$ Arietis E.	26 43 54	3151	25 16 46	3160	23 49 49	3170	22 23 4	3182
	Aldebaran E.	59 23 31	3155	57 56 28	3137	56 29 27	3158	55 2 27	3159
	Pollux E.	101 20 13	3093	99 51 55	3091	98 23 35	3090	96 55 13	3098
3	Venus E.	108 36 28	3343	107 13 5	3341	105 49 41	3339	104 26 15	3338
	Mars W.	90 29 11	3144	91 56 27	3141	93 23 47	3137	94 51 12	3133
	$\alpha$ Aquilæ W.	79 58 36	3655	81 16 0	3656	82 33 32	3649	83 51 14	3641
	Fomalhaut W.	54 55 12	3639	56 13 4	3616	57 31 21	3604	58 50 2	3579
	$\alpha$ Pegasi W.	32 11 52	3649	33 29 34	3600	34 48 8	3555	36 7 31	3517
	Aldebaran E.	47 47 56	3168	46 21 8	3170	44 54 23	3173	43 27 41	3176
4	Pollux E.	89 32 39	3073	88 3 57	3070	86 35 11	3067	85 6 21	3062
	Venus E.	97 28 30	3325	96 4 48	3322	94 41 2	3319	93 17 12	3314
	Jupiter E.	113 4 57	3130	111 37 24	3127	110 9 47	3122	108 42 4	3118
	Mars W.	102 9 29	3110	103 37 26	3105	105 5 31	3099	106 33 42	3092
	$\alpha$ Aquilæ W.	90 21 37	3610	91 40 1	3604	92 58 31	3599	94 17 7	3594
	Fomalhaut W.	65 28 58	3480	66 49 44	3463	68 10 49	3447	69 32 12	3431
5	$\alpha$ Pegasi W.	42 54 9	3364	44 17 7	3338	45 40 34	3316	47 4 27	3294
	Aldebaran E.	36 15 19	3200	34 49 10	3209	33 23 12	3220	31 57 26	3231
	Pollux E.	77 40 45	3038	76 11 19	3031	74 41 45	3026	73 12 4	3018
	Venus E.	86 16 43	3289	84 52 19	3284	83 27 49	3272	82 3 11	3270
	Jupiter E.	101 22 5	3091	99 53 45	3085	98 25 17	3078	96 56 41	3072
	Mars W.	113 56 44	3065	115 25 49	3047	116 55 4	3038	118 24 30	3029
6	$\alpha$ Aquilæ W.	100 51 11	3377	102 10 10	3376	103 29 10	3374	104 48 13	3374
	Fomalhaut W.	76 23 22	3359	77 46 25	3345	79 9 44	3332	80 33 18	3319
	$\alpha$ Pegasi W.	54 9 56	3196	55 38 10	3180	57 2 43	3162	58 29 38	3145
	Pollux E.	65 41 28	2968	64 10 52	2973	62 40 6	2965	61 9 9	2967
	Venus E.	74 57 54	3231	73 32 21	3222	72 6 38	3214	70 40 45	3204
	Jupiter E.	89 31 23	3090	88 1 48	3022	86 32 3	3012	85 2 5	3002
7	Sun E.	118 13 39	3325	116 49 57	3316	115 26 4	3306	114 1 59	3294
	Fomalhaut W.	87 34 57	3264	89 0 2	3243	90 25 22	3231	91 50 54	3219
	$\alpha$ Pegasi W.	65 49 17	3092	67 18 13	3045	68 47 30	3029	70 17 7	3014
	$\alpha$ Arietis W.	23 15 59	2977	23 46 41	2964	25 17 55	2927	26 49 39	2906
	Pollux E.	53 31 27	2908	51 59 18	2897	50 26 55	2885	48 54 17	2876
	Venus E.	63 28 14	3148	62 1 3	3145	60 33 38	3124	59 5 58	3112
8	Jupiter E.	77 29 0	2946	75 57 40	2935	74 26 5	2921	72 54 13	2909
	Sun E.	106 58 15	3235	105 32 47	3223	104 7 4	3208	102 41 4	3194
	Fomalhaut W.	99 2 11	3161	100 29 7	3149	101 56 17	3140	103 23 38	3129
9	$\alpha$ Pegasi W.	77 50 14	2981	79 21 54	2962	80 53 55	2938	82 26 17	2931
	$\alpha$ Arietis W.	34 34 39	2811	36 8 52	2794	37 43 28	2775	39 18 28	2757
	Pollux E.	41 7 38	2918	39 33 35	2908	37 59 16	2796	36 24 43	2786
10	Venus E.	51 43 36	3043	50 14 16	3028	48 44 38	3013	47 14 41	2997



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of DM.	IIIh.	P. L. of DM.	VIh.	P. L. of DM.	IXh.	P. L. of DM.
		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>	
7	Jupiter E.	71 22 5	2886	69 49 40	2883	68 16 58	2887	66 43 57	2888
	SUN E.	101 14 48	3181	99 49 16	3167	98 21 27	3151	96 54 19	3136
8	Fomalhaut W.	104 51 12	3119	106 18 58	3110	107 46 55	3103	109 15 12	3094
	α Pegasi W.	83 59 0	2885	85 32 4	2848	87 5 30	2831	88 39 18	2814
	α Arietis W.	40 53 52	2739	42 29 40	2730	44 5 53	2704	45 42 28	2684
	Pollux E.	34 49 57	2775	33 14 57	2766	31 39 44	2658	30 4 21	2749
	Venus E.	45 44 25	2861	44 13 49	2866	42 42 53	2860	41 11 38	2884
	Jupiter E.	58 54 8	2778	57 19 9	2780	55 43 49	2744	54 8 7	2727
	SUN E.	89 33 51	3054	88 4 45	3087	86 35 18	3019	85 5 29	3001
9	α Arietis W.	53 51 41	2891	55 30 48	2873	57 10 20	2854	58 50 18	2835
	Aldebaran W.	23 6 26	2973	24 37 13	2906	26 9 24	2848	27 42 50	2797
	Venus E.	33 30 6	2880	31 56 43	2884	30 22 59	2818	28 48 54	2801
	Jupiter E.	46 3 56	2640	44 25 55	2622	42 47 30	2604	41 8 40	2585
	SUN E.	77 30 44	2900	75 58 36	2890	74 26 4	2871	72 53 8	2862
10	α Arietis W.	67 16 46	2430	68 59 25	2423	70 42 29	2401	72 26 2	2384
	Aldebaran W.	35 44 55	2690	37 23 52	2667	39 3 32	2636	40 43 55	2608
	Jupiter E.	32 48 16	2494	31 6 55	2474	29 25 9	2460	27 42 59	2441
	SUN E.	65 2 6	2768	63 26 37	2764	61 50 42	2716	60 14 22	2685
11	α Arietis W.	81 10 24	2292	82 56 35	2273	84 43 14	2256	86 30 18	2230
	Aldebaran W.	49 15 19	2880	50 59 22	2867	52 43 58	2836	54 29 6	2814
	SUN E.	59 6 13	2801	50 27 20	2808	48 48 1	2668	47 8 19	2548
12	α Arietis W.	95 31 51	2180	97 21 21	2144	99 11 13	2129	101 1 28	2116
	Aldebaran W.	63 22 11	2218	65 10 12	2201	66 58 38	2184	68 47 29	2169
	Pollux W.	21 14 36	2808	23 0 31	2806	24 47 20	2235	26 34 56	2205
	SUN E.	38 44 2	2470	37 2 7	2466	35 19 52	2444	33 37 19	2422
17	SUN W.	32 15 51	2412	33 59 8	2422	35 42 11	2435	37 24 56	2446
	Antares E.	40 58 58	2061	39 7 29	2092	37 16 18	2108	35 25 28	2121
	Mars E.	87 56 53	2196	86 8 19	2210	84 20 6	2234	82 32 14	2259
	α Aquilæ E.	95 12 35	2676	93 35 23	2687	91 58 25	2698	90 21 43	2713
18	SUN W.	45 53 50	2623	47 34 31	2580	49 14 50	2546	50 54 46	2514
	Mars E.	73 38 37	2820	71 53 6	2837	70 8 1	2856	68 23 21	2873
	α Aquilæ E.	82 23 30	2804	80 49 7	2837	79 15 14	2851	77 41 52	2876
	Fomalhaut E.	107 3 43	2616	105 25 10	2626	103 46 50	2637	102 8 45	2647
19	SUN W.	59 8 14	2666	60 45 39	2665	62 22 39	2704	63 59 13	2723
	Mars E.	59 46 39	2467	58 4 40	2486	56 23 7	2507	54 42 3	2526
	α Aquilæ E.	70 3 47	2627	68 34 7	2603	67 5 10	2608	65 36 58	2596
	Fomalhaut E.	94 2 38	2721	92 26 26	2728	90 50 37	2746	89 15 11	2773
	α Pegasi E.	115 49 48	2631	114 9 18	2664	112 29 6	2698	110 49 13	2670
20	SUN W.	71 55 41	2821	73 29 42	2840	75 3 18	2860	76 36 29	2887
	Mars E.	46 23 29	2626	44 45 9	2644	43 7 14	2668	41 29 47	2684
	α Aquilæ E.	58 28 18	2361	57 5 17	2414	55 43 16	2469	54 22 17	2527
	Fomalhaut E.	81 24 20	2676	79 51 31	2690	76 19 11	2821	76 47 19	2844
	α Pegasi E.	102 34 42	2647	100 56 51	2683	99 19 22	2680	97 49 15	2693
21	SUN W.	84 16 26	2670	85 47 15	2680	87 17 41	2698	88 47 46	2694
	Antares W.	15 10 46	2624	16 49 9	2639	18 27 11	2656	20 4 50	2671



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
		<sup>o</sup> <sup>i</sup> <sup>"</sup>		<sup>o</sup> <sup>i</sup> <sup>"</sup>		<sup>o</sup> <sup>i</sup> <sup>"</sup>		<sup>o</sup> <sup>i</sup> <sup>"</sup>	
7	Jupiter E.	65 10 38	2698	63 37 0	2694	62 3 3	2608	60 28 45	2708
	SUN E.	95 26 52	3119	93 59 6	3104	92 31 1	3097	91 2 36	3071
8	Fomalhaut W.	110 43 59	3087	112 11 45	3080	113 40 19	3074	115 9 0	3070
	α Pegasi W.	90 13 28	2797	91 48 0	2781	93 22 53	2763	94 58 9	2746
	α Arietis W.	47 19 29	2606	48 56 55	2647	50 34 46	2630	52 13 0	2610
	Pollux E.	28 28 46	2743	26 53 2	2738	25 17 13	2737	23 41 22	2737
	Venus E.	39 40 2	2917	38 8 5	2900	36 35 46	2894	35 3 7	2847
	Jupiter E.	52 32 3	2710	50 55 36	2693	49 18 46	2675	47 41 32	2658
	SUN E.	83 35 18	2968	82 4 44	2966	80 33 48	2946	79 2 28	2927
9	α Arietis W.	60 30 43	2616	62 11 34	2497	63 52 51	2478	65 34 35	2459
	Aldebaran W.	29 17 22	2780	30 52 55	2708	32 29 24	2689	34 6 45	2633
	Venus E.	27 14 28	2789	25 39 41	2770	24 4 34	2766	22 29 8	2742
	Jupiter E.	39 29 25	2608	37 49 46	2649	36 9 41	2631	34 29 11	2613
	SUN E.	71 19 47	2931	69 46 0	2911	68 11 47	2792	66 37 9	2773
10	α Arietis W.	74 10 0	2665	75 54 25	2646	77 39 18	2628	79 24 37	2609
	Aldebaran W.	42 24 57	2480	44 6 38	2454	45 48 56	2429	47 31 50	2404
	Jupiter E.	26 0 23	2424	24 17 22	2408	22 33 59	2391	20 50 12	2378
	SUN E.	58 37 36	2675	57 0 23	2657	55 22 45	2638	53 44 41	2620
11	α Arietis W.	88 17 48	2223	90 5 42	2206	91 54 1	2190	93 42 44	2174
	Aldebaran W.	56 14 45	2294	58 0 53	2274	59 47 31	2255	61 34 37	2236
	SUN E.	45 28 13	2631	43 47 43	2616	42 6 51	2499	40 25 37	2485
12	α Arietis W.	102 52 3	2108	104 42 58	2090	106 34 13	2078	108 25 46	2068
	Aldebaran W.	70 36 43	2134	72 26 20	2120	74 16 19	2126	76 6 38	2115
	Pollux W.	28 23 14	2180	30 12 11	2169	32 1 42	2137	33 51 44	2118
	SUN E.	31 54 30	2431	30 11 25	2412	28 28 8	2406	26 44 40	2441
17	SUN W.	39 7 23	2461	40 49 31	2476	42 31 19	2490	44 12 46	2507
	Antares E.	33 35 1	2136	31 44 55	2130	29 55 12	2166	28 5 53	2183
	Mars E.	80 44 44	2334	78 57 37	2369	77 10 52	2287	75 24 33	2302
	α Aquilæ E.	88 45 20	2729	87 9 18	2744	85 33 37	2763	83 58 21	2782
18	SUN W.	52 34 17	2691	54 13 24	2610	55 52 6	2626	57 30 23	2647
	Mars E.	66 39 7	2291	64 55 19	2410	63 11 58	2427	61 29 4	2449
	α Aquilæ E.	76 9 2	2908	74 36 47	2931	73 5 8	2962	71 34 8	2993
	Fomalhaut E.	100 30 54	2680	98 53 21	2675	97 16 7	2689	95 39 13	2704
19	SUN W.	65 35 22	2743	67 11 5	2763	68 46 22	2781	70 21 15	2801
	Mars E.	53 1 25	2446	51 21 16	2465	49 41 33	2485	48 2 17	2505
	α Aquilæ E.	64 9 33	2178	62 42 55	2319	61 17 8	2366	59 52 15	2311
	Fomalhaut E.	87 40 8	2794	86 5 32	2814	84 31 22	2834	82 57 38	2854
	α Pegasi E.	109 9 39	2666	107 30 23	2601	105 51 29	2616	104 12 55	2631
20	SUN W.	78 9 17	2916	79 41 40	2935	81 13 38	2963	82 45 14	2971
	Mars E.	39 52 48	2706	38 16 13	2726	36 40 6	2744	35 4 25	2766
	α Aquilæ E.	53 2 23	2460	51 43 38	2637	50 26 5	2728	49 9 48	2802
	Fomalhaut E.	75 15 56	2969	73 45 4	2993	72 14 42	3018	70 44 52	3044
	α Pegasi E.	96 5 29	2713	94 29 6	2729	92 53 5	2746	91 17 26	2763
21	SUN W.	90 17 29	3042	91 46 50	3068	93 15 51	3075	94 44 31	3091
	Antares W.	21 42 9	2687	23 19 6	2702	24 55 43	2717	26 32 0	2732



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Day.	IIIh.	P. L. of Day.	Vth.	P. L. of Day.	IXh.	P. L. of Day.
21	Mars E.	33 29 12	2785	31 54 25	2906	30 20 4	2826	28 46 10	2649
	Fomalhaut E.	69 15 34	3071	67 46 49	3098	66 18 37	3126	64 50 59	3155
	$\alpha$ Pegasi E.	89 42 9	2780	88 7 15	2797	86 32 43	2813	84 58 33	2881
22	SUN W.	96 12 51	3108	97 40 51	3123	99 8 33	3188	100 35 56	3153
	Antares W.	28 7 58	2747	29 43 35	2761	31 18 54	2775	32 53 54	2799
	Fomalhaut E.	57 41 50	3316	56 17 57	3350	54 54 43	3398	53 32 13	3437
	$\alpha$ Pegasi E.	77 13 8	2914	75 41 7	2961	74 9 28	2949	72 38 11	2965
23	SUN W.	107 48 27	3224	109 14 8	3238	110 39 32	3249	112 4 43	3262
	Antares W.	40 44 35	2682	42 17 55	2684	43 51 0	2675	45 23 51	2686
	Fomalhaut E.	46 51 33	3661	45 34 4	3718	44 17 34	3776	43 9 7	3841
	$\alpha$ Pegasi E.	65 6 57	3049	63 37 45	3066	62 8 54	3083	60 40 24	3101
	$\alpha$ Arietis E.	107 10 23	2870	105 37 26	2880	104 4 42	2891	102 32 12	2901
24	SUN W.	119 7 8	3319	120 30 58	3328	121 54 37	3339	123 18 3	3349
	Antares W.	53 4 44	2986	54 36 17	2945	56 7 39	2963	57 38 51	2961
	$\alpha$ Pegasi E.	53 23 17	3193	51 56 59	3215	50 31 5	3233	49 5 35	3254
	$\alpha$ Arietis E.	94 53 0	2961	93 21 46	2961	91 50 44	2968	90 19 51	2977
25	Antares W.	65 12 24	2997	66 42 40	3003	68 12 49	3009	69 42 51	3015
	Mars W.	15 31 44	3272	16 56 28	3263	18 21 23	3265	19 46 27	3249
	$\alpha$ Pegasi E.	42 4 45	3380	40 42 6	3410	39 20 1	3443	37 58 33	3479
	$\alpha$ Arietis E.	82 47 58	3014	81 18 2	3020	79 48 14	3036	78 18 33	3051
	Aldebaran E.	114 59 57	3069	113 31 10	3074	112 2 29	3078	110 33 52	3082
26	Antares W.	77 11 20	3039	78 40 45	3042	80 10 6	3047	81 39 21	3049
	Mars W.	26 52 50	3243	28 18 9	3243	29 43 28	3244	31 8 45	3244
	$\alpha$ Arietis E.	70 51 48	3066	69 22 45	3060	67 53 47	3065	66 24 54	3068
	Aldebaran E.	103 12 5	3101	101 43 57	3104	100 15 52	3106	98 47 50	3110
27	Antares W.	89 4 46	3062	90 33 42	3064	92 2 36	3066	93 31 28	3067
	$\alpha$ Aquilæ W.	43 43 26	4620	44 47 0	4446	45 51 40	4379	46 57 20	4319
	Mars W.	38 14 57	3249	39 40 8	3261	41 5 17	3261	42 30 26	3263
	$\alpha$ Arietis E.	59 1 33	3064	57 33 4	3067	56 4 38	3060	54 36 16	3061
	Aldebaran E.	91 28 33	3121	90 0 49	3124	88 33 8	3124	87 5 27	3126
28	Antares W.	100 55 26	3070	102 24 12	3071	103 52 57	3071	105 21 42	3071
	$\alpha$ Aquilæ W.	52 38 28	4077	53 48 52	4089	54 59 53	4005	56 11 28	3973
	Mars W.	49 35 59	3253	51 1 5	3263	52 26 12	3263	53 51 18	3253
	$\alpha$ Arietis E.	47 15 1	3101	45 46 53	3103	44 18 47	3105	42 50 44	3107
29	Aldebaran E.	79 47 36	3132	78 20 5	3133	76 52 36	3132	75 25 7	3134
	$\alpha$ Aquilæ W.	62 16 43	3841	63 31 3	3821	64 45 43	3801	66 0 44	3783
	Mars W.	60 56 57	3248	62 22 9	3246	63 47 24	3245	65 12 37	3244
	Fomalhaut W.	37 47 9	4292	38 54 46	4178	40 3 33	4140	41 13 25	4048
	$\alpha$ Arietis E.	35 31 3	3118	34 3 15	3120	32 35 40	3124	31 7 59	3127
	Aldebaran E.	68 7 54	3136	66 40 28	3138	65 13 4	3138	63 45 39	3136
30	Pollux E.	110 11 41	3063	108 43 23	3091	107 15 2	3080	105 46 40	3067
	Mars W.	72 19 19	3235	73 44 47	3232	75 10 18	3230	76 35 52	3227
	$\alpha$ Aquilæ W.	72 20 15	3706	73 36 56	3698	74 53 50	3681	76 10 57	3671
	Fomalhaut W.	47 16 22	3810	48 31 14	3774	49 46 43	3730	51 2 48	3710
	Aldebaran E.	56 28 43	3139	55 1 21	3140	53 34 0	3141	52 6 40	3143
	Pollux E.	98 24 12	3077	96 55 34	3073	95 26 52	3071	93 58 7	3069



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
		<sup>O</sup> <sup>I</sup> <sup>N</sup>		<sup>O</sup> <sup>I</sup> <sup>N</sup>		<sup>O</sup> <sup>I</sup> <sup>N</sup>		<sup>O</sup> <sup>I</sup> <sup>N</sup>	
21	Mars E.	27 19 44	2869	25 39 45	2891	24 7 14	2913	22 35 12	2936
	Fomalhaut E.	63 23 56	3185	61 57 29	3215	60 31 38	3247	59 6 24	3261
	α Pegasi E.	83 24 45	2847	81 51 18	2864	80 18 13	2881	78 45 30	2896
22	SUN W.	102 3 1	3169	103 29 47	3183	104 56 17	3197	106 22 30	3210
	Antares W.	34 28 36	2892	36 3 1	2915	37 37 9	2928	39 11 0	2941
	Fomalhaut E.	52 10 27	3469	50 49 28	3513	49 29 18	3568	48 9 58	3609
	α Pegasi E.	71 7 15	2981	69 36 39	2996	68 6 24	3015	66 36 30	3032
23	SUN W.	113 29 39	3274	114 54 21	3286	116 18 49	3296	117 43 5	3307
	Antares W.	46 56 28	2897	48 28 51	2907	50 1 1	2916	51 32 59	2927
	Fomalhaut E.	41 47 47	3913	40 34 39	3968	39 22 48	4073	38 12 20	4168
	α Pegasi E.	59 12 15	3119	57 44 28	3126	56 17 2	3124	54 49 58	3173
	α Arietis E.	100 59 55	2913	99 27 53	2923	97 56 3	2983	96 24 26	2942
24	SUN W.	124 41 19	3346	126 4 24	3366	127 27 19	3375	128 50 4	3384
	Antares W.	59 9 53	2989	60 40 45	2977	62 11 27	2984	63 42 0	2991
	α Pegasi E.	47 40 30	3276	46 15 51	3300	44 51 40	3325	43 27 57	3351
	α Arietis E.	88 49 10	2965	87 18 38	2993	85 48 16	2999	84 18 2	3007
25	Antares W.	71 12 45	3021	72 42 32	3026	74 12 13	3030	75 41 49	3034
	Mars W.	21 11 38	3246	23 36 53	3244	24 2 10	3242	25 27 30	3242
	α Pegasi E.	36 37 45	3518	35 17 41	3502	33 58 25	3509	32 40 0	3563
	α Arietis E.	76 48 59	3037	75 19 33	3042	73 50 11	3047	72 20 56	3062
	Aldebaran E.	109 5 21	3087	107 36 56	3091	106 8 35	3094	104 40 18	3097
26	Antares W.	83 8 33	3052	84 37 41	3065	86 6 45	3087	87 35 47	3080
	Mars W.	32 34 2	3245	33 59 18	3247	35 24 32	3247	36 49 45	3248
	α Arietis E.	64 56 5	3072	63 27 21	3076	61 58 42	3079	60 30 6	3081
	Aldebaran E.	97 19 53	3113	95 51 58	3115	94 24 7	3118	92 56 19	3119
27	Antares W.	95 0 18	3086	96 29 7	3089	97 57 55	3070	99 26 41	3071
	α Aquilæ W.	48 3 55	4261	49 11 24	4210	50 19 41	4161	51 28 44	4118
	Mars W.	43 55 33	3252	45 20 41	3253	46 45 48	3254	48 10 53	3253
	α Arietis E.	53 7 56	3083	51 39 38	3096	50 11 23	3098	48 43 11	3100
	Aldebaran E.	85 37 50	3129	84 10 14	3129	82 42 40	3130	81 15 7	3132
28	Antares W.	106 50 27	3070	108 19 13	3069	109 48 0	3069	111 16 48	3070
	α Aquilæ W.	57 23 34	3942	58 36 11	3915	59 49 16	3899	61 2 47	3864
	Mars W.	55 16 24	3292	56 41 32	3233	58 6 39	3251	59 31 48	3250
	α Arietis E.	41 22 43	3109	39 54 44	3110	38 26 47	3113	36 58 53	3116
	Aldebaran E.	73 57 40	3134	72 30 12	3135	71 2 45	3137	69 35 20	3136
29	α Aquilæ W.	67 16 4	3766	68 31 43	3749	69 47 38	3734	71 3 49	3720
	Mars W.	66 37 52	3243	68 3 11	3242	69 28 31	3210	70 53 53	3226
	Fomalhaut W.	42 24 17	3991	43 36 5	3939	44 48 45	3993	46 2 12	3951
	α Arietis E.	29 40 12	3131	28 12 40	3137	26 45 15	3143	25 17 58	3150
	Aldebaran E.	62 18 16	3136	60 50 52	3138	59 23 29	3138	57 56 6	3136
	Pollux E.	104 18 15	3086	102 49 48	3094	101 21 19	3092	99 52 47	3079
30	Mars W.	78 1 29	3224	79 27 10	3221	80 52 54	3218	82 18 42	3214
	α Aquilæ W.	77 28 15	3861	78 45 44	3650	80 3 24	3642	81 21 13	3634
	Fomalhaut W.	52 19 24	3679	53 36 33	3652	54 54 11	3627	56 12 16	3605
	Aldebaran E.	50 39 23	3142	49 12 5	3145	47 44 50	3247	46 17 38	3149
	Pollux E.	92 29 19	3065	91 0 27	3062	89 31 31	3059	88 2 31	3056



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sideral Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		h. m. s.	s.		° ' "	"					
Mon.	1	12 31 15.83	9.062	S. 3 22 37.6	58.24	16 1.73	64.39	10 28.08	0.794		
Tues.	2	12 34 53.45	9.075	3 45 54.1	58.14	16 2.01	64.44	10 46.97	0.780		
Wed.	3	12 38 31.39	9.089	4 9 8.0	58.08	16 2.29	64.49	11 5.53	0.766		
Thur.	4	12 42 9.69	9.105	4 32 18.9	57.90	16 2.56	64.54	11 23.73	0.751		
Fri.	5	12 45 48.36	9.122	4 55 26.8	57.76	16 2.83	64.59	11 41.56	0.735		
Sat.	6	12 49 27.43	9.139	5 18 31.1	57.61	16 3.10	64.65	11 59.00	0.717		
Sun.	7	12 53 6.92	9.157	5 41 31.6	57.44	16 3.38	64.71	12 16.01	0.699		
Mon.	8	12 56 46.85	9.176	6 4 27.8	57.25	16 3.65	64.77	12 32.58	0.681		
Tues.	9	13 0 27.24	9.195	6 27 19.3	57.05	16 3.92	64.84	12 48.71	0.662		
Wed.	10	13 4 8.10	9.214	6 50 5.7	56.83	16 4.19	64.91	13 4.36	0.641		
Thur.	11	13 7 49.46	9.235	7 12 46.6	56.59	16 4.46	64.98	13 19.51	0.620		
Fri.	12	13 11 31.33	9.257	7 35 21.7	56.34	16 4.73	65.06	13 34.15	0.599		
Sat.	13	13 15 13.72	9.279	7 57 50.6	56.07	16 5.00	65.14	13 48.28	0.577		
Sun.	14	13 18 56.64	9.302	8 20 13.0	55.78	16 5.27	65.22	14 1.88	0.554		
Mon.	15	13 22 40.12	9.325	8 42 28.2	55.48	16 5.54	65.30	14 14.92	0.531		
Tues.	16	13 26 24.18	9.349	9 4 35.9	55.16	16 5.82	65.38	14 27.38	0.507		
Wed.	17	13 30 8.82	9.373	9 26 35.9	54.83	16 6.10	65.47	14 39.26	0.482		
Thur.	18	13 33 54.05	9.398	9 48 27.7	54.47	16 6.38	65.56	14 50.54	0.457		
Fri.	19	13 37 39.90	9.424	10 10 10.6	54.10	16 6.66	65.65	15 1.22	0.431		
Sat.	20	13 41 26.38	9.450	10 31 44.6	53.71	16 6.93	65.74	15 11.27	0.405		
Sun.	21	13 45 13.49	9.477	10 53 9.0	53.31	16 7.20	65.84	15 20.69	0.379		
Mon.	22	13 49 1.24	9.505	11 14 23.8	52.99	16 7.47	65.94	15 29.47	0.351		
Tues.	23	13 52 49.65	9.534	11 35 28.2	52.46	16 7.74	66.04	15 37.60	0.323		
Wed.	24	13 56 38.75	9.563	11 56 21.9	52.01	16 8.01	66.14	15 45.03	0.294		
Thur.	25	14 0 28.55	9.592	12 17 4.5	51.54	16 8.28	66.24	15 51.76	0.265		
Fri.	26	14 4 19.07	9.621	12 37 35.7	51.06	16 8.54	66.35	15 57.78	0.235		
Sat.	27	14 8 10.32	9.651	12 57 55.3	50.56	16 8.80	66.46	16 3.07	0.205		
Sun.	28	14 12 2.30	9.682	13 18 2.8	50.04	16 9.06	66.57	16 7.63	0.174		
Mon.	29	14 15 55.04	9.713	13 37 57.6	49.51	16 9.32	66.68	16 11.44	0.142		
Tues.	30	14 19 48.54	9.746	13 57 39.5	48.96	16 9.57	66.79	16 14.49	0.109		
Wed.	31	14 23 42.83	9.780	14 17 8.1	48.40	16 9.82	66.90	16 16.75	0.076		
Thur.	32	14 27 37.93	9.814	S. 14 36 23.1	47.82	16 10.06	67.01	16 18.21	0.042		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sideral Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time.			
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.								
		h.	m.	s.	s.	°	'	"	"			m.	s.	s.	h.
Mon.	1	12	31	17.41	9.062	S. 3	22	47.8	58.24	10	28.22	0.794	12	41	45.63
Tues.	2	12	34	55.08	9.075	3	46	4.6	58.14	10	47.11	0.780	12	45	42.19
Wed.	3	12	38	33.07	9.089	4	9	18.8	58.03	11	5.67	0.766	12	49	38.74
Thur.	4	12	42	11.42	9.105	4	32	30.0	57.90	11	23.87	0.751	12	53	35.29
Fri.	5	12	45	50.14	9.122	4	55	38.1	57.76	11	41.70	0.735	12	57	31.84
Sat.	6	12	49	29.26	9.139	5	18	42.6	57.61	11	59.14	0.717	13	1	28.40
Sun.	7	12	53	8.80	9.157	5	41	43.4	57.44	12	16.15	0.699	13	5	24.95
Mon.	8	12	56	48.78	9.176	6	4	39.8	57.25	12	32.72	0.681	13	9	21.50
Tues.	9	13	0	29.21	9.195	6	27	31.5	57.05	12	48.85	0.662	13	13	18.06
Wed.	10	13	4	10.11	9.214	6	50	18.1	56.83	13	4.50	0.641	13	17	14.61
Thur.	11	13	7	51.51	9.235	7	12	59.2	56.59	13	19.65	0.620	13	21	11.16
Fri.	12	13	11	33.42	9.257	7	35	34.5	56.34	13	34.28	0.599	13	25	7.72
Sat.	13	13	15	15.85	9.279	7	58	3.6	56.07	13	48.42	0.577	13	29	4.27
Sun.	14	13	18	58.81	9.302	8	20	26.1	55.78	14	2.02	0.554	13	33	0.83
Mon.	15	13	22	42.33	9.325	8	42	41.4	55.48	14	15.05	0.531	13	36	57.88
Tues.	16	13	26	26.43	9.349	9	4	49.2	55.16	14	27.50	0.507	13	40	53.93
Wed.	17	13	30	11.11	9.373	9	26	49.3	54.83	14	39.38	0.482	13	44	50.49
Thur.	18	13	33	56.38	9.398	9	48	41.2	54.47	14	50.66	0.457	13	48	47.04
Fri.	19	13	37	42.26	9.424	10	10	24.2	54.10	15	1.34	0.431	13	52	43.60
Sat.	20	13	41	28.77	9.450	10	31	58.2	53.71	15	11.38	0.405	13	56	40.15
Sun.	21	13	45	15.91	9.477	10	53	22.6	53.31	15	20.80	0.379	14	0	36.71
Mon.	22	13	49	3.69	9.505	11	14	37.4	52.89	15	29.57	0.351	14	4	33.26
Tues.	23	13	52	52.13	9.534	11	35	41.8	52.46	15	37.69	0.323	14	8	29.82
Wed.	24	13	56	41.26	9.563	11	56	35.5	52.01	15	45.11	0.294	14	12	26.37
Thur.	25	14	0	31.09	9.592	12	17	18.1	51.54	15	51.83	0.265	14	16	22.92
Fri.	26	14	4	21.63	9.621	12	37	49.3	51.06	15	57.85	0.235	14	20	19.48
Sat.	27	14	8	12.90	9.651	12	58	8.8	50.56	16	3.13	0.205	14	24	16.03
Sun.	28	14	12	4.90	9.682	13	18	16.2	50.04	16	7.69	0.174	15	28	12.59
Mon.	29	14	15	57.66	9.713	13	38	10.9	49.51	16	11.48	0.142	14	32	9.14
Tues.	30	14	19	51.18	9.746	13	57	52.7	48.96	16	14.52	0.109	14	36	5.70
Wed.	31	14	23	45.48	9.780	14	17	21.2	48.40	16	16.77	0.076	14	40	2.25
Thur.	32	14	27	40.59	9.814	S. 14	36	36.1	47.82	16	18.22	0.042	14	43	58.81

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	275	188° 31' 22.7"	30° 30.4'	147.68	+0.60	0.0001207	51.8	h m s 11 16 23.26	
2	276	189 30 28.2	29 35.8	147.77	0.58	9.9999967	51.5	11 12 27.35	
3	277	190 29 35.8	28 43.3	147.86	0.54	.9998731	51.4	11 8 31.44	
4	278	191 28 45.5	27 52.9	147.96	0.46	.9997499	51.3	11 4 35.53	
5	279	192 27 57.5	27 4.8	148.06	0.36	.9996271	51.1	11 0 39.63	
6	280	193 27 11.9	26 19.1	148.16	0.23	.9995046	51.0	10 56 43.72	
7	281	194 26 28.7	25 35.8	148.25	+0.10	.9993823	51.0	10 52 47.81	
8	282	195 25 47.9	24 54.9	148.35	-0.03	.9992600	50.9	10 48 51.90	
9	283	196 25 9.3	24 16.2	148.45	0.16	.9991377	50.9	10 44 55.99	
10	284	197 24 33.0	23 39.8	148.54	0.28	.9990154	51.0	10 41 0.09	
11	285	198 23 59.0	23 5.7	148.63	0.40	.9988931	51.0	10 37 4.18	
12	286	199 23 27.2	22 33.7	148.72	0.50	.9087705	51.1	10 33 8.27	
13	287	200 22 57.6	22 4.0	148.81	0.57	.9986477	51.2	10 29 12.36	
14	288	201 22 30.2	21 36.5	148.90	0.60	.9985247	51.3	10 25 16.45	
15	289	202 22 4.8	21 11.0	148.98	0.60	.9984015	51.4	10 21 20.55	
16	290	203 21 41.4	20 47.5	149.06	0.58	.9982781	51.5	10 17 24.64	
17	291	204 21 19.9	20 25.8	149.14	0.53	.9981545	51.5	10 13 28.73	
18	292	205 21 0.3	20 6.2	149.22	0.44	.9980308	51.5	10 9 32.82	
19	293	206 20 42.5	19 48.2	149.30	0.35	.9979072	51.5	10 5 36.91	
20	294	207 20 26.4	19 32.0	149.37	0.23	.9977838	51.3	10 1 41.00	
21	295	208 20 12.0	19 17.5	149.44	-0.10	.9976608	51.1	9 57 45.09	
22	296	209 19 59.3	19 4.6	149.51	+0.03	.9975383	50.9	9 53 49.18	
23	297	210 19 48.3	18 53.5	149.58	0.16	.9974166	50.6	9 49 53.27	
24	298	211 19 39.0	18 44.1	149.65	0.27	.9972957	50.2	9 45 57.36	
25	299	212 19 31.5	18 36.5	149.72	0.37	.9971758	49.7	9 42 1.46	
26	300	213 19 25.7	18 30.6	149.79	0.45	.9970570	49.2	9 38 5.55	
27	301	214 19 21.6	18 26.3	149.86	0.50	.9969396	48.6	9 34 9.64	
28	302	215 19 19.2	18 23.8	149.94	0.51	.9968237	49.0	9 30 13.73	
29	303	216 19 18.7	18 23.2	150.02	0.51	.9967093	47.3	9 26 17.82	
30	304	217 19 20.0	18 24.4	150.10	0.48	.9965962	46.6	9 22 21.92	
31	305	218 19 23.3	18 27.5	150.18	0.40	.9964847	46.0	9 18 26.01	
32	306	219 19 28.5	18 32.5	150.26	+0.30	9.9963749	45.4	9 14 30.10	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.



GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.		
							h. m.	m.	d.	
1	14 48.3	14 50.2	54 13.3	+0.53	54 20.2	+0.63	13 3.2	1.83	16.2	
2	14 52.4	14 55.0	54 28.5	0.73	54 38.2	0.85	13 48.7	1.96	17.2	
3	14 58.0	15 1.5	54 49.3	0.98	55 1.9	1.12	14 37.3	2.09	18.2	
4	15 5.4	15 9.7	55 16.1	1.26	55 31.9	1.39	15 29.0	2.20	19.2	
5	15 14.4	15 19.5	55 49.2	1.52	56 8.1	1.65	16 23.0	2.28	20.2	
6	15 25.1	15 31.1	56 28.5	1.77	56 50.4	1.88	17 18.4	2.31	21.2	
7	15 37.4	15 44.0	57 13.6	1.98	57 37.9	2.06	18 13.9	2.29	22.2	
8	15 50.8	15 57.8	58 3.0	2.11	58 28.6	2.13	19 8.4	2.24	23.2	
9	16 4.8	16 11.6	58 54.2	2.11	59 19.3	2.05	20 1.5	2.19	24.2	
10	16 18.2	16 24.4	59 43.6	1.94	60 6.3	1.79	20 53.5	2.16	25.2	
11	16 29.9	16 34.6	60 26.6	1.57	60 43.9	1.30	21 45.2	2.17	26.2	
12	16 38.4	16 41.1	60 57.7	0.98	61 7.5	+0.63	22 37.5	2.21	27.2	
13	16 42.5	16 42.6	61 12.8	+0.24	61 13.3	-0.16	23 31.5	2.30	28.2	
14	16 41.5	16 39.0	61 9.0	-0.56	60 59.9	0.96	♄		29.2	
15	16 35.3	16 30.5	60 46.3	1.31	60 28.6	1.63	0 27.8	2.40	0.9	
16	16 24.7	16 18.1	60 7.3	1.90	59 43.1	2.13	1 26.6	2.49	1.9	
17	16 10.9	16 3.3	59 16.6	2.28	58 48.6	2.37	2 26.9	2.51	2.9	
18	15 55.4	15 47.5	58 19.8	2.41	57 50.9	2.40	3 27.0	2.46	3.9	
19	15 39.8	15 32.3	57 22.3	2.34	56 54.7	2.24	4 24.8	2.33	4.9	
20	15 25.2	15 18.5	56 28.5	2.11	56 4.1	1.95	5 18.9	2.17	5.9	
21	15 12.4	15 6.8	55 41.7	1.78	55 21.4	1.60	6 8.8	2.00	6.9	
22	15 1.9	14 57.7	55 3.4	1.40	54 47.8	1.20	6 54.9	1.85	7.9	
23	14 54.1	14 51.1	54 34.6	1.00	54 23.8	0.81	7 37.8	1.74	8.9	
24	14 48.8	14 47.1	54 15.2	0.62	54 8.8	0.44	8 18.6	1.68	9.9	
25	14 45.9	14 45.3	54 4.6	-0.27	54 2.4	-0.10	8 58.4	1.65	10.9	
26	14 45.3	14 45.7	54 2.2	+0.06	54 3.8	+0.20	9 38.1	1.67	11.9	
27	14 46.5	14 47.8	54 6.9	0.33	54 11.5	0.44	10 18.7	1.73	12.9	
28	14 49.4	14 51.3	54 17.5	0.55	54 24.7	0.65	11 1.2	1.82	13.9	
29	14 53.6	14 56.2	54 33.0	0.74	54 42.3	0.82	11 46.2	1.94	14.9	
30	14 59.0	15 2.0	54 52.5	0.90	55 3.6	0.97	12 34.3	2.07	15.9	
31	15 5.3	15 8.8	55 15.6	1.04	55 28.4	1.10	13 25.5	2.19	16.9	
32	15 12.4	15 16.3	55 41.9	+1.16	55 56.2	+1.22	14 19.1	2.26	17.9	



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 1.					WEDNESDAY 3.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	1 21 59.75	1.8968	N.14 1 54.0	11.397	0	2 57 57.95	2.1122	N.21 51 41.0	7.320
1	1 23 53.67	1.9005	14 13 16.2	11.344	1	3 0 4.85	2.1172	21 59 27.3	7.732
2	1 25 47.81	1.9043	14 24 35.2	11.290	2	3 2 12.04	2.1222	22 7 7.6	7.093
3	1 27 42.18	1.9081	14 35 50.9	11.235	3	3 4 19.52	2.1272	22 14 42.0	7.323
4	1 29 36.77	1.9119	14 47 3.4	11.179	4	3 6 27.30	2.1321	22 22 10.4	7.422
5	1 31 31.60	1.9158	14 58 12.5	11.122	5	3 8 35.38	2.1371	22 29 32.7	7.230
6	1 33 26.67	1.9197	15 9 18.1	11.064	6	3 10 43.76	2.1420	22 36 48.9	7.318
7	1 35 21.96	1.9237	15 20 20.3	11.006	7	3 12 52.43	2.1470	22 43 58.9	7.115
8	1 37 17.49	1.9277	15 31 19.0	10.946	8	3 15 1.40	2.1519	22 51 2.7	7.011
9	1 39 13.27	1.9317	15 42 14.0	10.886	9	3 17 10.67	2.1568	22 58 0.2	6.906
10	1 41 9.30	1.9358	15 53 5.4	10.825	10	3 19 20.23	2.1617	23 4 51.4	6.800
11	1 43 5.57	1.9399	16 3 53.1	10.763	11	3 21 30.08	2.1666	23 11 36.2	6.692
12	1 45 2.09	1.9440	16 14 37.2	10.700	12	3 23 40.23	2.1715	23 18 14.4	6.583
13	1 46 58.86	1.9482	16 25 17.4	10.637	13	3 25 50.67	2.1764	23 24 46.1	6.474
14	1 48 55.88	1.9524	16 35 53.7	10.573	14	3 28 1.40	2.1813	23 31 11.3	6.364
15	1 50 53.15	1.9567	16 46 26.1	10.508	15	3 30 12.42	2.1862	23 37 29.9	6.253
16	1 52 50.68	1.9610	16 56 54.6	10.442	16	3 32 23.73	2.1910	23 43 41.8	6.142
17	1 54 48.47	1.9653	17 7 19.1	10.375	17	3 34 35.33	2.1958	23 49 47.0	6.030
18	1 56 46.53	1.9697	17 17 39.5	10.307	18	3 36 47.22	2.2006	23 55 45.4	5.917
19	1 58 44.85	1.9741	17 27 55.8	10.238	19	3 38 59.39	2.2053	24 1 37.0	5.803
20	2 0 43.43	1.9785	17 38 7.9	10.167	20	3 41 11.84	2.2099	24 7 21.6	5.687
21	2 2 42.28	1.9830	17 48 15.8	10.096	21	3 43 24.57	2.2146	24 12 59.3	5.570
22	2 4 41.40	1.9875	17 58 19.4	10.024	22	3 45 37.68	2.2192	24 18 30.0	5.452
23	2 6 40.79	1.9921	N.18 8 18.6	9.951	23	3 47 50.87	2.2238	N.24 23 53.6	5.334
TUESDAY 2.					THURSDAY 4.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	2 8 40.45	1.9967	N.18 18 13.4	9.878	0	3 50 4.44	2.2284	N.24 29 10.1	5.215
1	2 10 40.39	2.0013	18 28 3.8	9.803	1	3 52 18.28	2.2330	24 34 19.4	5.096
2	2 12 40.61	2.0060	18 37 49.7	9.727	2	3 54 32.39	2.2375	24 39 21.5	4.976
3	2 14 41.10	2.0107	18 47 31.0	9.650	3	3 56 46.77	2.2420	24 44 16.4	4.855
4	2 16 41.87	2.0154	18 57 7.7	9.572	4	3 59 1.42	2.2464	24 49 4.0	4.733
5	2 18 42.93	2.0201	19 6 39.7	9.495	5	4 1 16.33	2.2507	24 53 44.2	4.610
6	2 20 44.28	2.0248	19 16 6.9	9.413	6	4 3 31.51	2.2550	24 58 16.9	4.486
7	2 22 45.91	2.0295	19 25 29.3	9.332	7	4 5 46.94	2.2593	25 2 42.1	4.360
8	2 24 47.82	2.0343	19 34 46.9	9.251	8	4 8 2.63	2.2635	25 6 59.9	4.232
9	2 26 50.01	2.0391	19 43 59.6	9.169	9	4 10 18.57	2.2677	25 11 10.1	4.106
10	2 28 52.49	2.0439	19 53 7.3	9.086	10	4 12 34.77	2.2718	25 15 12.7	3.978
11	2 30 55.26	2.0487	20 2 10.0	9.002	11	4 14 51.92	2.2759	25 19 7.6	3.850
12	2 32 58.33	2.0535	20 11 7.6	8.917	12	4 17 7.92	2.2800	25 22 54.8	3.721
13	2 35 1.69	2.0583	20 20 0.1	8.831	13	4 19 24.85	2.2840	25 26 34.2	3.593
14	2 37 5.33	2.0632	20 28 47.3	8.744	14	4 21 42.01	2.2879	25 30 5.9	3.463
15	2 39 9.26	2.0681	20 37 29.3	8.656	15	4 23 59.42	2.2918	25 33 29.7	3.332
16	2 41 13.49	2.0730	20 46 6.0	8.567	16	4 26 17.06	2.2957	25 36 45.6	3.200
17	2 43 18.02	2.0779	20 54 37.3	8.477	17	4 28 34.92	2.2995	25 39 53.6	3.067
18	2 45 22.83	2.0828	21 3 3.1	8.386	18	4 30 53.02	2.3033	25 42 53.6	2.933
19	2 47 27.94	2.0877	21 11 23.5	8.294	19	4 33 11.34	2.3070	25 45 45.6	2.799
20	2 49 33.35	2.0926	21 19 38.3	8.201	20	4 35 29.87	2.3106	25 48 29.5	2.664
21	2 51 39.05	2.0975	21 27 47.5	8.107	21	4 37 48.62	2.3142	25 51 5.2	2.529
22	2 53 45.05	2.1024	21 35 51.1	8.013	22	4 40 7.68	2.3177	25 53 32.8	2.393
23	2 55 51.35	2.1073	21 43 49.0	7.917	23	4 42 26.75	2.3212	25 55 52.3	2.257
24	2 57 57.95	2.1122	N.21 51 41.0	7.820	24	4 44 46.13	2.3247	N.25 58 3.6	2.119



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 5.					SUNDAY 7.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	4 44 46.13	2.3047	N.25 58 3.6	2.119	0	6 38 45.88	2.3943	N.24 52 57.3	4.922
1	4 47 5.71	2.3051	26 0 6.6	1.981	1	6 41 9.52	2.3938	24 47 57.5	6.071
2	4 49 25.48	2.3313	26 2 1.9	1.943	2	6 43 33.13	2.3932	24 42 48.8	6.220
3	4 51 45.44	2.3344	26 3 47.5	1.704	3	6 45 56.70	2.3926	24 37 31.1	6.368
4	4 54 5.58	2.3374	26 5 25.5	1.665	4	6 48 20.24	2.3919	24 32 4.5	6.516
5	4 56 25.91	2.3408	26 6 55.0	1.425	5	6 50 43.73	2.3912	24 26 20.1	6.664
6	4 58 46.42	2.3422	26 8 16.2	1.384	6	6 53 7.17	2.3904	24 20 44.9	6.811
7	5 1 7.11	2.3440	26 9 28.9	1.142	7	6 55 30.56	2.3896	24 14 51.8	6.958
8	5 3 27.96	2.3456	26 10 23.1	0.989	8	6 57 53.90	2.3886	24 8 49.9	6.106
9	5 5 48.98	2.3516	26 11 28.7	0.886	9	7 0 17.18	2.3876	24 2 39.2	6.252
10	5 8 10.16	2.3532	26 12 15.7	0.713	10	7 2 40.39	2.3865	23 56 19.8	6.398
11	5 10 31.50	2.3569	26 12 54.1	0.568	11	7 5 3.53	2.3853	23 49 51.6	6.544
12	5 12 52.98	2.3604	26 13 23.9	0.434	12	7 7 26.61	2.3840	23 43 14.6	6.690
13	5 15 14.61	2.3617	26 13 45.1	0.290	13	7 9 49.61	2.3827	23 36 28.9	6.835
14	5 17 36.38	2.3640	26 13 57.6	0.125	14	7 12 12.54	2.3814	23 29 34.6	6.979
15	5 19 58.29	2.3692	26 14 1.4	0.010	15	7 14 35.39	2.3800	23 22 31.7	7.122
16	5 22 20.33	2.3698	26 13 56.4	0.186	16	7 16 58.15	2.3786	23 15 20.2	7.265
17	5 24 42.50	2.3704	26 13 42.7	0.302	17	7 19 20.82	2.3772	23 8 0.0	7.408
18	5 27 4.80	2.3724	26 13 20.3	0.448	18	7 21 43.41	2.3757	23 0 31.2	7.550
19	5 29 27.21	2.3744	26 12 49.1	0.595	19	7 24 5.90	2.3742	22 52 54.0	7.692
20	5 31 49.73	2.3768	26 12 9.0	0.742	20	7 26 28.30	2.3726	22 45 8.3	7.833
21	5 34 12.36	2.3781	26 11 20.1	0.889	21	7 28 50.60	2.3709	22 37 14.1	7.973
22	5 36 35.09	2.3798	26 10 22.3	1.085	22	7 31 12.80	2.3692	22 29 11.5	8.113
23	5 38 57.92	2.3814	N.26 9 15.6	1.164	23	7 33 34.90	2.3674	N.22 21 0.5	8.253
SATURDAY 6.					MONDAY 8.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	5 41 20.85	2.3822	N.26 8 0.0	1.332	0	7 35 56.89	2.3656	N.22 12 41.1	8.392
1	5 43 43.86	2.3842	26 6 35.6	1.480	1	7 38 18.78	2.3638	22 4 13.4	8.530
2	5 46 6.95	2.3856	26 5 2.3	1.639	2	7 40 40.56	2.3619	21 55 37.4	8.668
3	5 48 30.12	2.3867	26 3 20.0	1.778	3	7 43 2.22	2.3600	21 46 53.2	8.806
4	5 50 53.36	2.3879	26 1 28.7	1.927	4	7 45 23.76	2.3581	21 38 0.8	8.941
5	5 53 16.67	2.3890	25 59 28.5	2.077	5	7 47 45.19	2.3562	21 29 0.3	9.076
6	5 55 40.04	2.3900	25 57 19.4	2.227	6	7 50 6.51	2.3542	21 19 51.7	9.211
7	5 58 3.47	2.3909	25 55 1.3	2.377	7	7 52 27.71	2.3522	21 10 35.0	9.346
8	6 0 26.96	2.3917	25 52 34.2	2.527	8	7 54 48.78	2.3502	21 1 10.3	9.478
9	6 2 50.49	2.3928	25 49 58.1	2.677	9	7 57 9.73	2.3482	20 51 37.6	9.611
10	6 5 14.06	2.3932	25 47 13.0	2.827	10	7 59 30.56	2.3461	20 41 57.0	9.748
11	6 7 37.67	2.3938	25 44 18.9	2.977	11	8 1 51.27	2.3440	20 32 8.6	9.874
12	6 10 1.32	2.3948	25 41 15.8	3.127	12	8 4 11.85	2.3419	20 22 12.3	10.006
13	6 12 25.00	2.3947	25 38 3.7	3.277	13	8 6 32.30	2.3398	20 12 8.3	10.136
14	6 14 48.69	2.3950	25 34 42.6	3.427	14	8 8 52.63	2.3377	20 1 56.5	10.263
15	6 17 12.40	2.3958	25 31 12.5	3.577	15	8 11 12.82	2.3356	19 51 37.0	10.390
16	6 19 36.12	2.3966	25 27 33.4	3.727	16	8 13 32.88	2.3334	19 41 9.9	10.516
17	6 21 59.86	2.3966	25 23 45.3	3.877	17	8 15 52.82	2.3312	19 30 35.3	10.641
18	6 24 23.61	2.3966	25 19 48.2	4.027	18	8 18 12.63	2.3290	19 19 53.1	10.766
19	6 26 47.35	2.3966	25 15 42.2	4.177	19	8 20 32.31	2.3268	19 9 3.5	10.888
20	6 29 11.08	2.3966	25 11 27.2	4.326	20	8 22 51.85	2.3246	18 58 6.5	11.010
21	6 31 34.81	2.3968	25 7 3.2	4.476	21	8 25 11.26	2.3224	18 47 2.2	11.132
22	6 33 58.52	2.3960	25 2 30.2	4.624	22	8 27 30.54	2.3202	18 35 50.5	11.253
23	6 36 22.21	2.3947	24 57 48.2	4.773	23	8 29 49.69	2.3180	18 24 31.6	11.373
24	6 38 45.88	2.3943	N.24 52 57.3	4.922	24	8 32 8.71	2.3159	N.18 13 5.6	11.493



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 9.					THURSDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	8 32 8.71	2.3169	N. 18 13 5.6	11.498	0	10 21 11.03	2.3430	N. 7 6 30.7	15.772
1	8 34 27.60	2.3138	18 1 32.4	11.611	1	10 23 25.52	2.3415	6 50 42.8	15.926
2	8 36 46.35	2.3117	17 49 52.1	11.728	2	10 25 39.99	2.3410	6 34 51.6	15.978
3	8 39 4.97	2.3094	17 38 4.9	11.844	3	10 27 54.44	2.3405	6 18 57.4	15.929
4	8 41 23.47	2.3072	17 26 10.8	11.969	4	10 30 8.87	2.3402	6 3 0.2	15.978
5	8 43 41.84	2.3060	17 14 9.8	12.072	5	10 32 23.29	2.3401	5 47 0.0	16.025
6	8 46 0.07	2.3039	17 2 2.1	12.184	6	10 34 37.70	2.3401	5 30 57.0	16.071
7	8 48 18.18	2.3008	16 49 47.6	12.296	7	10 36 52.11	2.3402	5 14 51.3	16.115
8	8 50 36.16	2.2987	16 37 26.4	12.406	8	10 39 6.52	2.3406	4 58 43.1	16.166
9	8 52 54.02	2.2966	16 24 58.7	12.514	9	10 41 20.94	2.3404	4 42 32.4	16.199
10	8 55 11.75	2.2945	16 12 24.5	12.622	10	10 43 35.36	2.3405	4 26 19.3	16.228
11	8 57 29.35	2.2924	15 59 43.8	12.731	11	10 45 49.79	2.3406	4 10 3.8	16.276
12	8 59 46.83	2.2903	15 46 56.6	12.838	12	10 48 4.24	2.3410	3 53 46.1	16.312
13	9 2 4.19	2.2883	15 34 3.1	12.943	13	10 50 18.71	2.3413	3 37 26.4	16.346
14	9 4 21.43	2.2863	15 21 3.4	13.047	14	10 52 33.90	2.3417	3 21 4.7	16.378
15	9 6 38.54	2.2843	15 7 57.5	13.150	15	10 54 47.71	2.3422	3 4 41.1	16.408
16	9 8 55.54	2.2824	14 54 45.5	13.251	16	10 57 2.26	2.3426	2 48 15.8	16.436
17	9 11 12.43	2.2806	14 41 27.5	13.351	17	10 59 16.85	2.3430	2 31 48.8	16.463
18	9 13 29.21	2.2786	14 28 3.5	13.449	18	11 1 31.48	2.3443	2 15 20.2	16.488
19	9 15 45.87	2.2768	14 14 33.6	13.546	19	11 3 46.16	2.3450	1 58 50.1	16.511
20	9 18 2.42	2.2750	14 0 57.9	13.642	20	11 6 0.86	2.3456	1 42 18.8	16.532
21	9 20 18.86	2.2732	13 47 16.5	13.737	21	11 8 15.65	2.3467	1 25 46.3	16.553
22	9 22 35.19	2.2714	13 33 29.4	13.831	22	11 10 30.48	2.3477	1 9 12.6	16.570
23	9 24 51.42	2.2697	N. 13 19 36.8	13.924	23	11 12 45.37	2.3487	N. 0 52 37.9	16.586
WEDNESDAY 10.					FRIDAY 12.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	9 27 7.54	2.2680	N. 13 5 38.6	14.016	0	11 15 0.32	2.3486	N. 0 36 2.2	16.600
1	9 29 23.57	2.2663	12 51 35.0	14.105	1	11 17 15.34	2.3510	0 19 25.8	16.612
2	9 31 39.50	2.2647	12 37 26.1	14.198	2	11 19 30.43	2.3532	N. 0 2 48.7	16.623
3	9 33 55.34	2.2631	12 23 12.0	14.290	3	11 21 45.60	2.3555	S. 0 13 49.0	16.632
4	9 36 11.09	2.2616	12 8 52.6	14.385	4	11 24 0.85	2.3549	0 30 27.1	16.639
5	9 38 26.74	2.2602	11 54 28.1	14.449	5	11 26 16.19	2.3564	0 47 5.5	16.644
6	9 40 42.31	2.2588	11 39 58.7	14.532	6	11 28 31.62	2.3579	1 3 44.1	16.647
7	9 42 57.80	2.2574	11 25 24.4	14.614	7	11 30 47.14	2.3595	1 20 22.8	16.647
8	9 45 13.20	2.2561	11 10 45.2	14.694	8	11 33 2.75	2.3612	1 37 1.6	16.646
9	9 47 28.52	2.2548	10 56 1.2	14.772	9	11 35 18.47	2.3629	1 53 40.3	16.642
10	9 49 43.77	2.2535	10 41 12.5	14.848	10	11 37 34.29	2.3647	2 10 18.8	16.637
11	9 51 58.95	2.2522	10 26 19.3	14.923	11	11 39 50.91	2.3665	2 26 56.9	16.630
12	9 54 14.05	2.2512	10 11 21.6	14.997	12	11 42 6.95	2.3684	2 43 34.3	16.621
13	9 56 29.09	2.2501	9 56 19.4	15.070	13	11 44 22.41	2.3703	3 0 11.2	16.610
14	9 58 44.07	2.2490	9 41 12.9	15.142	14	11 46 38.69	2.3723	3 16 47.5	16.597
15	10 0 58.99	2.2480	9 26 2.3	15.213	15	11 48 55.09	2.3744	3 33 23.0	16.582
16	10 3 13.84	2.2470	9 10 47.5	15.282	16	11 51 11.62	2.3766	3 49 57.5	16.565
17	10 5 28.64	2.2461	8 55 28.6	15.349	17	11 53 28.99	2.3789	4 6 30.9	16.547
18	10 7 43.39	2.2453	8 40 5.7	15.414	18	11 55 45.10	2.3812	4 23 3.2	16.527
19	10 9 58.10	2.2446	8 24 39.0	15.478	19	11 58 2.04	2.3836	4 39 34.1	16.504
20	10 12 12.76	2.2440	8 9 8.5	15.540	20	12 0 19.13	2.3861	4 56 3.6	16.479
21	10 14 27.38	2.2435	7 53 34.3	15.600	21	12 2 36.36	2.3886	5 12 31.6	16.442
22	10 16 41.97	2.2430	7 37 56.5	15.659	22	12 4 53.75	2.3912	5 28 58.0	16.423
23	10 18 56.52	2.2425	7 22 15.3	15.716	23	12 7 11.30	2.3938	5 45 22.6	16.398
24	10 21 11.03	2.2420	N. 7 6 30.7	15.772	24	12 9 29.00	2.3965	S. 6 1 45.2	16.361



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 13.					MONDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	13 9 29.00	2.2966	S. 6 1 45.9	16.961	0	14 3 39.99	2.4714	S. 17 51 17.1	12.463
1	13 11 46.87	2.2992	6 18 5.8	16.927	1	14 6 8.40	2.4738	18 3 40.5	12.326
2	13 14 4.90	2.3020	6 34 24.3	16.991	2	14 8 37.04	2.4793	18 15 56.3	12.196
3	13 16 23.10	2.3048	6 50 40.6	16.922	3	14 11 5.91	2.4830	18 28 4.2	12.068
4	13 18 41.47	2.3077	7 6 54.5	16.911	4	14 13 35.01	2.4868	18 40 4.2	11.936
5	13 21 0.02	2.3107	7 23 5.9	16.168	5	14 16 4.34	2.4908	18 51 56.2	11.802
6	13 23 18.75	2.3137	7 39 14.6	16.123	6	14 18 33.90	2.4944	19 3 40.2	11.666
7	13 25 37.66	2.3167	7 55 20.5	16.076	7	14 21 3.68	2.4982	19 15 16.0	11.528
8	13 27 56.78	2.3198	8 11 23.6	16.027	8	14 23 33.68	2.5019	19 26 43.6	11.389
9	13 30 16.05	2.3230	8 27 23.7	15.976	9	14 26 3.90	2.5066	19 38 2.8	11.249
10	13 32 35.54	2.3263	8 43 20.7	15.923	10	14 28 34.34	2.5092	19 49 13.6	11.106
11	13 34 55.22	2.3296	8 59 14.5	15.869	11	14 31 4.99	2.5127	20 0 15.9	10.966
12	13 37 15.09	2.3329	9 15 5.0	15.811	12	14 33 35.85	2.5162	20 11 9.8	10.822
13	13 39 35.16	2.3363	9 30 51.9	15.752	13	14 36 6.92	2.5198	20 21 54.5	10.676
14	13 41 55.45	2.3397	9 46 35.2	15.691	14	14 38 38.19	2.5229	20 32 30.6	10.529
15	13 44 15.94	2.3432	10 2 14.8	15.628	15	14 41 9.66	2.5262	20 42 57.9	10.381
16	13 46 36.63	2.3467	10 17 50.5	15.563	16	14 43 41.33	2.5296	20 53 16.3	10.232
17	13 48 57.54	2.3503	10 33 22.3	15.496	17	14 46 13.19	2.5327	21 3 25.7	10.082
18	13 51 18.66	2.3539	10 48 50.0	15.427	18	14 48 45.24	2.5358	21 13 26.0	9.931
19	13 53 40.00	2.3576	11 4 13.5	15.356	19	14 51 17.47	2.5388	21 23 17.1	9.778
20	13 56 1.55	2.3612	11 19 32.7	15.283	20	14 53 49.88	2.5417	21 32 59.0	9.624
21	13 58 23.33	2.3649	11 34 47.5	15.208	21	14 56 22.47	2.5445	21 42 31.6	9.468
22	13 0 45.33	2.3686	11 49 57.7	15.131	22	14 58 55.22	2.5473	21 51 54.9	9.310
23	13 3 7.56	2.3723	S. 12 5 3.1	15.052	23	15 1 28.14	2.5500	S. 22 1 8.7	9.151
SUNDAY 14.					TUESDAY 16.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	13 5 30.01	2.3760	S. 12 20 3.8	14.971	0	15 4 1.23	2.5527	S. 22 10 13.0	8.991
1	13 7 52.69	2.3798	12 34 59.6	14.887	1	15 6 34.47	2.5553	22 19 7.7	8.831
2	13 10 15.60	2.3836	12 49 50.3	14.802	2	15 9 7.87	2.5578	22 27 52.8	8.670
3	13 12 38.75	2.3875	13 4 35.8	14.716	3	15 11 41.41	2.5603	22 36 28.2	8.508
4	13 15 2.14	2.3914	13 19 16.0	14.626	4	15 14 15.08	2.5628	22 44 53.8	8.345
5	13 17 25.76	2.3953	13 33 50.9	14.535	5	15 16 48.89	2.5647	22 53 9.7	8.181
6	13 19 49.61	2.3993	13 48 20.2	14.443	6	15 19 22.83	2.5668	23 1 15.7	8.016
7	13 22 13.69	2.4033	14 2 43.9	14.347	7	15 21 56.89	2.5687	23 9 11.7	7.851
8	13 24 38.01	2.4073	14 17 2.0	14.250	8	15 24 31.06	2.5708	23 16 57.8	7.685
9	13 27 2.58	2.4113	14 31 14.2	14.151	9	15 27 5.35	2.5728	23 24 33.9	7.518
10	13 29 27.39	2.4153	14 45 20.4	14.050	10	15 29 39.74	2.5740	23 32 0.0	7.350
11	13 31 52.43	2.4193	14 59 20.4	13.948	11	15 32 14.22	2.5756	23 39 16.0	7.182
12	13 34 17.71	2.4233	15 13 14.2	13.844	12	15 34 48.80	2.5771	23 46 21.8	7.013
13	13 36 43.24	2.4274	15 27 1.8	13.738	13	15 37 23.47	2.5788	23 53 17.5	6.843
14	13 39 9.01	2.4315	15 40 43.0	13.630	14	15 39 58.22	2.5797	24 0 3.0	6.672
15	13 41 35.02	2.4356	15 54 17.6	13.521	15	15 42 33.03	2.5808	24 6 38.2	6.501
16	13 44 1.28	2.4397	16 7 45.5	13.410	16	15 45 7.91	2.5818	24 13 3.2	6.329
17	13 46 27.78	2.4437	16 21 6.7	13.297	17	15 47 42.84	2.5827	24 19 17.9	6.167
18	13 48 54.52	2.4477	16 34 21.0	13.182	18	15 50 17.82	2.5835	24 25 22.2	5.995
19	13 51 21.50	2.4517	16 47 28.4	13.065	19	15 52 52.85	2.5842	24 31 16.1	5.822
20	13 53 48.72	2.4557	17 0 28.7	12.946	20	15 55 27.91	2.5847	24 36 59.6	5.650
21	13 56 16.18	2.4597	17 13 21.8	12.825	21	15 58 3.00	2.5851	24 42 32.8	5.486
22	13 58 43.88	2.4636	17 26 7.6	12.702	22	16 0 38.11	2.5853	24 47 55.6	5.322
23	14 1 11.82	2.4675	17 38 46.1	12.578	23	16 3 13.23	2.5853	24 53 7.0	5.158
24	14 3 39.99	2.4714	S. 17 51 17.1	12.453	24	16 5 48.35	2.5853	S. 24 68 9.7	4.993



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 17.					FRIDAY 19.				
0	h. m. s.	"	S. ° ' "	"	0	h. m. s.	"	S. ° ' "	"
0	16 5 48.35	2.8858	S. 24 58 9.7	4.943	0	18 7 30.77	2.4400	S. 25 38 19.2	2.849
1	16 8 23.47	2.8853	25 3 1.0	4.768	1	18 9 57.03	2.4380	25 35 11.9	2.196
2	16 10 58.59	2.8851	25 7 41.9	4.598	2	18 12 22.95	2.4358	25 31 55.6	2.342
3	16 13 33.70	2.8847	25 12 12.3	4.418	3	18 14 48.54	2.4335	25 28 30.6	2.487
4	16 16 8.77	2.8842	25 16 32.2	4.243	4	18 17 13.78	2.4177	25 24 56.9	2.631
5	16 18 43.80	2.8835	25 20 41.6	4.068	5	18 19 38.67	2.4118	25 21 14.6	2.774
6	16 21 18.79	2.8837	25 24 40.5	3.893	6	18 22 3.21	2.4059	25 17 23.7	2.916
7	16 23 53.74	2.8818	25 28 28.9	3.718	7	18 24 27.39	2.4000	25 13 24.4	2.067
8	16 26 28.63	2.8808	25 32 6.8	3.543	8	18 26 51.21	2.3940	25 9 16.8	2.197
9	16 29 3.46	2.8797	25 35 34.2	3.368	9	18 29 14.67	2.3879	25 5 0.8	2.335
10	16 31 38.21	2.8785	25 38 51.1	3.196	10	18 31 37.76	2.3818	25 0 36.5	2.473
11	16 34 12.88	2.8771	25 41 57.6	3.021	11	18 34 0.49	2.3756	24 56 4.1	2.608
12	16 36 47.46	2.8766	25 44 53.6	2.847	12	18 36 22.83	2.3698	24 51 23.6	2.743
13	16 39 21.95	2.8759	25 47 39.1	2.673	13	18 38 44.80	2.3639	24 46 35.0	2.877
14	16 41 56.33	2.8751	25 50 14.1	2.499	14	18 41 6.39	2.3567	24 41 38.5	2.910
15	16 44 30.60	2.8752	25 52 38.7	2.325	15	18 43 27.61	2.3508	24 36 34.1	2.141
16	16 47 4.75	2.8681	25 54 53.0	2.152	16	13 45 48.44	2.3439	24 31 21.9	2.370
17	16 49 38.78	2.8659	25 56 58.9	1.979	17	18 48 8.88	2.3378	24 26 2.0	2.507
18	16 52 12.67	2.8636	25 58 50.4	1.806	18	18 50 28.94	2.3310	24 20 34.4	2.633
19	16 54 46.41	2.8611	26 0 33.6	1.634	19	18 52 48.61	2.3245	24 14 59.2	2.766
20	16 57 20.00	2.8585	26 2 6.5	1.462	20	18 55 7.89	2.3180	24 9 16.6	2.773
21	16 59 53.44	2.8558	26 3 29.0	1.291	21	18 57 26.78	2.3115	24 3 26.5	2.883
22	17 2 26.71	2.8530	26 4 41.3	1.120	22	18 59 45.28	2.3050	23 57 29.1	2.917
23	17 4 59.81	2.8501	S. 26 5 43.4	0.950	23	19 2 3.38	2.2984	S. 23 51 24.4	2.128
THURSDAY 18.					SATURDAY 20.				
0	h. m. s.	"	S. ° ' "	"	0	h. m. s.	"	S. ° ' "	"
0	17 7 32.73	2.8470	S. 26 6 35.4	0.781	0	19 4 21.08	2.2918	S. 23 45 12.4	2.268
1	17 10 5.46	2.8438	26 7 17.2	0.612	1	19 6 38.39	2.2862	23 38 53.3	2.377
2	17 12 37.99	2.8405	26 7 48.8	0.444	2	19 8 55.30	2.2795	23 32 27.2	2.481
3	17 15 10.32	2.8371	26 8 10.3	0.276	3	19 11 11.81	2.2718	23 25 54.1	2.510
4	17 17 42.44	2.8336	26 8 21.8	0.109	4	19 13 27.92	2.2642	23 19 14.1	2.734
5	17 20 14.34	2.8300	26 8 23.4	0.067	5	19 15 43.64	2.2566	23 12 27.3	2.637
6	17 22 46.02	2.8262	26 8 15.0	0.323	6	19 17 58.95	2.2490	23 5 33.7	2.949
7	17 25 17.40	2.8223	26 7 56.6	0.383	7	19 20 13.86	2.2414	22 58 33.5	2.000
8	17 27 48.68	2.8183	26 7 28.4	0.592	8	19 22 28.38	2.2337	22 51 26.6	2.170
9	17 30 19.65	2.8142	26 6 50.4	0.715	9	19 24 42.50	2.2260	22 44 13.2	2.275
10	17 32 50.36	2.8099	26 6 2.6	0.877	10	19 26 56.21	2.2183	22 36 53.4	2.383
11	17 35 20.82	2.8056	26 5 5.2	1.038	11	19 29 9.52	2.2106	22 29 27.2	2.490
12	17 37 51.02	2.8010	26 3 58.0	1.198	12	19 31 22.43	2.2119	22 21 54.7	2.594
13	17 40 20.95	2.7964	26 2 41.2	1.358	13	19 33 34.95	2.2043	22 14 16.0	2.697
14	17 42 50.60	2.7918	26 1 14.8	1.517	14	19 35 47.07	2.1967	22 6 31.1	2.799
15	17 45 19.97	2.7871	25 59 39.0	1.676	15	19 37 58.79	2.1891	21 58 40.1	2.899
16	17 47 49.06	2.7823	25 57 53.8	1.832	16	19 40 10.12	2.1815	21 50 43.1	2.998
17	17 50 17.85	2.7774	25 55 59.2	1.988	17	19 42 21.05	2.1739	21 42 40.3	3.096
18	17 52 46.35	2.7724	25 53 55.2	2.143	18	19 44 31.59	2.1726	21 34 31.6	3.193
19	17 55 14.55	2.7673	25 51 42.0	2.297	19	19 46 41.74	2.1649	21 26 17.1	3.289
20	17 57 42.43	2.7621	25 49 19.6	2.450	20	19 48 51.50	2.1568	21 17 56.8	3.384
21	18 0 9.90	2.7568	25 46 48.1	2.602	21	19 51 0.86	2.1488	21 9 30.9	3.478
22	18 2 37.24	2.7515	25 44 7.5	2.753	22	19 53 9.83	2.1403	21 0 59.4	3.571
23	18 5 4.17	2.7461	25 41 17.8	2.901	23	19 55 18.42	2.1308	20 52 22.5	3.663
24	18 7 30.77	2.7406	S. 25 38 19.2	3.049	24	19 57 26.62	2.1221	S. 20 43 40.1	3.753



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 21.					TUESDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	19 57 26.62	2.1334	S. 20 43 40.1	8.733	0	21 33 17.17	1.9808	S. 12 20 46.5	11.822
1	19 59 34.44	2.1370	20 34 52.4	8.840	1	21 35 9.88	1.9766	12 8 56.0	11.808
2	20 1 41.87	2.1307	20 25 59.4	8.927	2	21 37 2.37	1.9728	11 57 3.0	11.908
3	20 3 48.93	2.1144	20 17 1.1	9.013	3	21 38 54.63	1.9691	11 45 7.6	11.948
4	20 5 55.61	2.1091	20 7 57.7	9.099	4	21 40 46.68	1.9655	11 33 9.8	11.982
5	20 8 1.91	2.1018	19 58 49.3	9.182	5	21 42 38.51	1.9619	11 21 9.7	12.020
6	20 10 7.83	2.0956	19 49 35.8	9.265	6	21 44 30.12	1.9584	11 9 7.3	12.057
7	20 12 13.39	2.0895	19 40 17.4	9.347	7	21 46 21.52	1.9550	10 57 2.8	12.093
8	20 14 18.58	2.0834	19 30 54.1	9.428	8	21 48 12.72	1.9518	10 44 56.1	12.129
9	20 16 23.40	2.0773	19 21 26.1	9.508	9	21 50 3.73	1.9483	10 32 47.3	12.164
10	20 18 27.86	2.0713	19 11 53.2	9.587	10	21 51 54.54	1.9451	10 20 36.5	12.198
11	20 20 31.96	2.0653	19 2 15.7	9.664	11	21 53 45.15	1.9419	10 8 23.8	12.233
12	20 22 35.69	2.0594	18 52 33.6	9.740	12	21 55 35.57	1.9388	9 56 8.7	12.265
13	20 24 39.07	2.0535	18 42 47.0	9.815	13	21 57 25.81	1.9358	9 43 51.9	12.297
14	20 26 42.09	2.0476	18 32 55.9	9.890	14	21 59 15.87	1.9328	9 31 33.2	12.328
15	20 28 44.77	2.0417	18 23 0.4	9.963	15	22 1 5.75	1.9299	9 19 12.7	12.358
16	20 30 47.10	2.0359	18 13 0.5	10.034	16	22 2 55.46	1.9271	9 6 50.4	12.388
17	20 32 49.08	2.0301	18 2 56.3	10.105	17	22 4 45.00	1.9243	8 54 26.3	12.417
18	20 34 50.72	2.0244	17 52 47.9	10.175	18	22 4 34.38	1.9216	8 42 0.4	12.445
19	20 36 52.02	2.0186	17 42 35.4	10.243	19	22 8 23.61	1.9190	8 29 32.9	12.473
20	20 38 52.98	2.0128	17 32 18.8	10.310	20	22 10 12.68	1.9164	8 17 3.8	12.499
21	20 40 53.61	2.0078	17 21 58.1	10.377	21	22 12 1.59	1.9138	8 4 33.2	12.525
22	20 42 53.91	2.0024	17 11 33.5	10.443	22	22 13 50.35	1.9112	7 52 1.0	12.550
23	20 44 53.89	1.9970	S. 17 1 4.9	10.508	23	22 15 38.97	1.9091	S. 7 39 27.3	12.574
MONDAY 22.					WEDNESDAY 24.				
0	20 46 53.54	1.9916	S. 16 50 32.5	10.572	0	22 17 27.44	1.9068	S. 7 26 52.2	12.598
1	20 48 52.87	1.9863	16 39 56.3	10.635	1	22 19 15.78	1.9046	7 14 15.7	12.621
2	20 50 51.89	1.9810	16 29 16.3	10.696	2	22 21 3.99	1.9024	7 1 37.8	12.643
3	20 52 50.59	1.9758	16 18 32.7	10.756	3	22 22 52.08	1.9003	6 48 58.5	12.665
4	20 54 48.98	1.9706	16 7 45.5	10.816	4	22 24 40.04	1.8983	6 36 18.0	12.686
5	20 56 47.06	1.9655	15 56 54.7	10.875	5	22 26 27.88	1.8963	6 23 36.2	12.708
6	20 58 44.84	1.9605	15 46 0.4	10.933	6	22 28 15.61	1.8944	6 10 53.2	12.729
7	21 0 42.32	1.9555	15 35 2.7	10.990	7	22 30 3.22	1.8926	5 58 9.1	12.745
8	21 2 39.50	1.9506	15 24 1.6	11.046	8	22 31 50.72	1.8908	5 45 23.9	12.763
9	21 4 36.39	1.9456	15 12 57.1	11.101	9	22 33 38.12	1.8891	5 32 37.6	12.781
10	21 6 33.00	1.9410	15 1 49.3	11.155	10	22 35 25.43	1.8873	5 19 50.2	12.798
11	21 8 29.32	1.9363	14 50 38.3	11.208	11	22 37 12.64	1.8856	5 7 1.9	12.814
12	21 10 25.35	1.9316	14 39 24.2	11.261	12	22 38 59.75	1.8844	4 54 12.6	12.830
13	21 12 21.11	1.9270	14 28 6.0	11.313	13	22 40 46.77	1.8830	4 41 22.4	12.845
14	21 14 16.59	1.9224	14 16 46.6	11.364	14	22 42 33.72	1.8817	4 28 31.3	12.859
15	21 16 11.81	1.9179	14 5 23.3	11.414	15	22 44 20.59	1.8804	4 15 39.4	12.872
16	21 18 6.76	1.9135	13 53 57.0	11.463	16	22 46 7.38	1.8792	4 2 46.7	12.885
17	21 20 1.44	1.9091	13 42 27.8	11.511	17	22 47 54.09	1.8781	3 49 53.3	12.897
18	21 21 55.86	1.9048	13 30 55.7	11.558	18	22 49 40.74	1.8770	3 36 50.2	12.908
19	21 23 50.03	1.9006	13 19 20.9	11.604	19	22 51 27.33	1.8760	3 24 4.4	12.918
20	21 25 43.95	1.8964	13 7 43.3	11.649	20	22 53 13.86	1.8751	3 11 9.0	12.928
21	21 27 37.62	1.8923	12 56 3.0	11.693	21	22 55 0.33	1.8743	2 58 13.0	12.937
22	21 29 31.04	1.8882	12 44 20.1	11.737	22	22 56 46.75	1.8736	2 45 16.4	12.946
23	21 31 24.22	1.8842	12 32 34.6	11.780	23	22 58 33.12	1.8727	2 32 19.3	12.955
24	21 33 17.17	1.8803	S. 12 20 46.5	11.823	24	23 0 19.46	1.8719	S. 2 19 21.8	12.963



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 25.					SATURDAY 27.				
	h. m. s.	"	° ' "	"		h. m. s.	"	° ' "	"
0	23 0 19.46	1.7719	S. 2 19 21.8	12.968	0	0 25 48.38	1.8140	N. 7 58 33.1	12.515
1	23 2 5.76	1.7712	2 6 23.8	12.970	1	0 27 37.29	1.8164	8 11 3.3	12.489
2	23 3 52.01	1.7706	1 53 25.5	12.976	2	0 29 26.35	1.8188	8 23 31.8	12.463
3	23 5 38.23	1.7701	1 40 26.8	12.981	3	0 31 15.56	1.8212	8 35 58.6	12.434
4	23 7 24.42	1.7697	1 27 27.8	12.986	4	0 33 4.92	1.8236	8 48 23.6	12.405
5	23 9 10.59	1.7693	1 14 28.5	12.990	5	0 34 54.44	1.8260	9 0 46.9	12.375
6	23 10 56.75	1.7690	1 1 29.0	12.994	6	0 36 44.12	1.8281	9 13 8.4	12.344
7	23 12 42.89	1.7686	0 48 29.4	12.997	7	0 38 33.95	1.8318	9 25 28.0	12.312
8	23 14 29.01	1.7687	0 35 29.6	12.999	8	0 40 23.95	1.8346	9 37 45.7	12.279
9	23 16 15.13	1.7687	0 22 29.7	13.001	9	0 42 14.12	1.8374	9 50 1.4	12.245
10	23 18 1.24	1.7687	S. 0 9 29.7	13.002	10	0 44 4.46	1.8408	10 2 15.1	12.211
11	23 19 47.36	1.7687	N. 0 3 30.4	13.002	11	0 45 54.98	1.8438	10 14 26.7	12.176
12	23 21 33.48	1.7687	0 16 30.4	13.001	12	0 47 45.67	1.8463	10 26 36.1	12.140
13	23 23 19.60	1.7686	0 29 30.4	13.000	13	0 49 36.54	1.8494	10 38 43.4	12.108
14	23 25 5.74	1.7680	0 42 30.2	12.998	14	0 51 27.60	1.8526	10 50 48.5	12.065
15	23 26 51.89	1.7686	0 55 29.9	12.996	15	0 53 18.85	1.8556	11 2 51.4	12.027
16	23 28 38.06	1.7687	1 8 29.5	12.992	16	0 55 10.29	1.8590	11 14 51.9	11.986
17	23 30 24.25	1.7701	1 21 28.8	12.988	17	0 57 1.93	1.8622	11 26 50.0	11.948
18	23 32 10.47	1.7706	1 34 27.9	12.983	18	0 58 53.76	1.8655	11 38 45.7	11.907
19	23 33 56.72	1.7712	1 47 26.7	12.978	19	1 0 45.79	1.8688	11 50 39.0	11.866
20	23 35 43.01	1.7718	2 0 25.1	12.972	20	1 2 38.03	1.8722	12 2 29.8	11.824
21	23 37 29.34	1.7725	2 13 23.2	12.966	21	1 4 30.48	1.8757	12 14 17.9	11.781
22	23 39 15.71	1.7732	2 26 20.8	12.967	22	1 6 23.13	1.8792	12 26 3.4	11.737
23	23 41 2.12	1.7740	N. 2 39 18.0	12.966	23	1 8 15.99	1.8828	N. 12 37 46.3	11.692
FRIDAY 26.					SUNDAY 28.				
0	23 42 48.58	1.7748	N. 2 52 14.7	12.940	0	1 10 9.07	1.8864	N. 12 49 26.4	11.646
1	23 44 35.09	1.7767	3 5 10.9	12.930	1	1 12 2.37	1.8901	13 1 3.8	11.599
2	23 46 21.66	1.7767	3 18 6.3	12.920	2	1 13 55.89	1.8939	13 12 38.3	11.551
3	23 48 8.30	1.7777	3 31 1.2	12.909	3	1 15 49.64	1.8977	13 24 9.9	11.503
4	23 49 55.00	1.7788	3 43 55.5	12.896	4	1 17 43.61	1.9016	13 35 38.6	11.454
5	23 51 41.77	1.7800	3 56 49.0	12.886	5	1 19 37.81	1.9054	13 47 4.3	11.404
6	23 53 28.61	1.7818	4 9 41.8	12.873	6	1 21 32.24	1.9093	13 58 26.9	11.353
7	23 55 15.53	1.7836	4 22 33.8	12.859	7	1 23 26.91	1.9132	14 9 46.4	11.301
8	23 57 2.53	1.7840	4 35 25.0	12.844	8	1 25 21.82	1.9172	14 21 2.7	11.248
9	23 58 49.61	1.7854	4 48 15.2	12.829	9	1 27 16.97	1.9212	14 32 15.9	11.194
10	0 0 36.78	1.7869	5 1 4.5	12.814	10	1 29 12.36	1.9253	14 43 25.8	11.139
11	0 2 24.04	1.7885	5 13 52.8	12.798	11	1 31 8.00	1.9294	14 54 32.4	11.083
12	0 4 11.40	1.7901	5 26 40.2	12.781	12	1 33 3.89	1.9336	15 5 35.6	11.026
13	0 5 58.85	1.7918	5 39 26.5	12.763	13	1 35 0.03	1.9377	15 16 35.4	10.968
14	0 7 46.41	1.7935	5 52 11.7	12.744	14	1 36 56.42	1.9419	15 27 31.7	10.909
15	0 9 34.07	1.7963	6 4 55.7	12.724	15	1 38 53.06	1.9462	15 38 24.4	10.849
16	0 11 21.84	1.7972	6 17 38.5	12.708	16	1 40 49.97	1.9506	15 49 13.4	10.788
17	0 13 9.73	1.7992	6 30 20.1	12.692	17	1 42 47.13	1.9548	15 59 58.9	10.726
18	0 14 57.73	1.8013	6 43 0.4	12.660	18	1 44 44.55	1.9592	16 10 40.7	10.663
19	0 16 45.85	1.8033	6 55 39.4	12.637	19	1 46 42.24	1.9636	16 21 18.6	10.600
20	0 18 34.09	1.8062	7 8 17.1	12.614	20	1 48 40.20	1.9681	16 31 52.7	10.536
21	0 20 22.46	1.8073	7 20 53.3	12.590	21	1 50 38.43	1.9726	16 42 22.9	10.471
22	0 22 10.97	1.8095	7 33 28.0	12.566	22	1 52 36.92	1.9771	16 52 49.2	10.406
23	0 23 59.61	1.8117	7 46 1.3	12.541	23	1 54 35.69	1.9817	17 3 11.5	10.338
24	0 25 48.38	1.8140	N. 7 58 33.1	12.515	24	1 56 34.73	1.9863	N. 17 13 29.7	10.270



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 29.					WEDNESDAY 31.				
0	1 56 34.73	1.9863	N.17 13 29.7	10.270	0	3 37 31.77	2.2200	N.23 48 48.7	5.818
1	1 58 34.05	1.9909	17 23 43.8	10.301	1	3 39 45.10	2.2246	23 54 34.3	5.702
2	2 0 33.65	1.9956	17 33 53.7	10.131	2	3 41 58.71	2.2292	24 0 12.9	5.685
3	2 2 33.53	2.0003	17 43 59.4	10.060	3	3 44 12.59	2.2337	24 5 44.4	5.486
4	2 4 33.69	2.0040	17 54 0.7	9.987	4	3 46 26.73	2.2381	24 11 8.7	5.346
5	2 6 34.13	2.0097	18 3 57.7	9.913	5	3 48 41.14	2.2425	24 16 25.9	5.225
6	2 8 34.86	2.0145	18 13 50.3	9.839	6	3 50 55.81	2.2468	24 21 35.8	5.104
7	2 10 35.87	2.0193	18 23 38.4	9.764	7	3 53 10.74	2.2510	24 26 38.4	4.982
8	2 12 37.17	2.0241	18 33 32.0	9.688	8	3 55 25.93	2.2552	24 31 33.6	4.859
9	2 14 38.76	2.0289	18 43 0.9	9.611	9	3 57 41.37	2.2594	24 36 21.5	4.735
10	2 16 40.64	2.0337	18 52 35.2	9.533	10	3 59 57.06	2.2635	24 41 2.0	4.611
11	2 18 42.81	2.0386	19 2 4.8	9.454	11	4 2 13.00	2.2676	24 45 34.9	4.486
12	2 20 45.27	2.0435	19 11 29.6	9.374	12	4 4 29.18	2.2717	24 50 0.3	4.360
13	2 22 48.03	2.0484	19 20 49.6	9.293	13	4 6 45.60	2.2757	24 54 18.1	4.233
14	2 24 51.08	2.0533	19 30 4.6	9.211	14	4 9 2.96	2.2798	24 58 28.2	4.106
15	2 26 54.43	2.0582	19 39 14.7	9.128	15	4 11 19.15	2.2835	25 2 30.7	3.976
16	2 28 58.07	2.0632	19 48 19.9	9.044	16	4 13 36.28	2.2873	25 6 25.5	3.846
17	2 31 2.01	2.0682	19 57 19.9	8.960	17	4 15 53.63	2.2910	25 10 12.4	3.715
18	2 33 6.25	2.0732	20 6 14.7	8.873	18	4 18 11.19	2.2947	25 13 51.4	3.584
19	2 35 10.79	2.0782	20 15 4.3	8.786	19	4 20 28.97	2.2983	25 17 22.6	3.452
20	2 37 15.63	2.0832	20 23 48.7	8.697	20	4 22 46.97	2.3019	25 20 46.0	3.320
21	2 39 20.77	2.0882	20 32 27.8	8.607	21	4 25 5.19	2.3054	25 24 1.4	3.188
22	2 41 26.20	2.0932	20 41 1.5	8.516	22	4 27 23.61	2.3088	25 27 8.8	3.056
23	2 43 31.93	2.0983	N.20 49 29.7	8.425	23	4 29 42.24	2.3121	N.25 30 8.1	2.922
TUESDAY 30.					THURSDAY, NOVEMBER 1.				
0	2 45 37.07	2.1082	N.20 57 59.4	8.333	0	4 32 1.06	2.3153	N.25 32 59.4	2.788
1	2 47 44.31	2.1082	21 6 9.6	8.340					
2	2 49 50.94	2.1132	21 14 21.2	8.146					
3	2 51 57.88	2.1182	21 22 27.0	8.061					
4	2 54 5.12	2.1232	21 30 27.0	7.954					
5	2 56 12.66	2.1281	21 38 21.3	7.836					
6	2 58 20.49	2.1330	21 46 9.7	7.757					
7	3 0 28.62	2.1380	21 53 52.1	7.637					
8	3 2 37.06	2.1430	22 1 28.6	7.556					
9	3 4 45.79	2.1480	22 8 59.0	7.465					
10	3 6 54.81	2.1539	22 16 23.3	7.363					
11	3 9 4.13	2.1578	22 23 41.4	7.250					
12	3 11 13.75	2.1627	22 30 53.3	7.146					
13	3 13 23.67	2.1676	22 37 58.9	7.041					
14	3 15 33.88	2.1725	22 44 58.1	6.935					
15	3 17 44.38	2.1774	22 51 50.9	6.828					
16	3 19 55.17	2.1822	22 58 37.3	6.720					
17	3 22 6.25	2.1870	23 5 17.2	6.610					
18	3 24 17.62	2.1918	23 11 50.5	6.499					
19	3 26 29.27	2.1966	23 18 17.2	6.389					
20	3 28 41.21	2.2013	23 24 37.1	6.276					
21	3 30 53.43	2.2060	23 30 50.2	6.163					
22	3 33 5.93	2.2107	23 36 56.6	6.049					
23	3 35 18.71	2.2154	23 42 56.1	5.934					
24	3 37 31.77	2.2200	N.23 48 48.7	5.818					

## PHASES OF THE MOON.

	Day.	h.	m.
☾ Last Quarter, . .	7	11	4.8
● New Moon, . .	14	2	37.6
☾ First Quarter, . .	21	2	10.6
○ Full Moon, . .	29	6	49.9

	Day.	h.
☾ Perigee, . . . .	13	7.2
☾ Apogee, . . . .	25	19.3



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
1	Mars W.	83 44 34	3210	85 10 31	3208	86 36 31	3204	88 2 36	3199
	$\alpha$ Aquilæ W.	82 39 11	3205	83 57 18	3219	85 15 32	3211	86 33 54	3206
	Fomalhaut W.	57 30 45	3281	58 49 40	3261	60 8 57	3241	61 28 36	3222
	Aldebaran E.	44 50 27	3161	43 23 19	3184	41 56 15	3158	40 29 16	3163
	Pollux E.	86 33 27	3082	85 4 18	3048	83 35 5	3045	82 5 48	3041
2	Mars W.	95 14 18	3177	96 40 55	3172	98 7 38	3166	99 34 28	3160
	Fomalhaut W.	68 11 41	3442	69 33 10	3428	70 54 55	3415	72 16 55	3402
	$\alpha$ Pegasi W.	45 48 19	3206	47 12 24	3206	48 36 52	3206	50 1 43	3247
	Pollux E.	74 38 3	3019	73 8 14	3014	71 38 18	3008	70 8 15	3004
	Jupiter E.	103 34 39	3080	102 5 41	3066	100 36 37	3051	99 7 27	3045
	Venus E.	107 11 54	3270	105 49 3	3265	104 26 6	3249	103 3 3	3254
3	Mars W.	106 50 22	3122	108 17 56	3122	109 45 38	3116	111 13 28	3109
	Fomalhaut W.	79 10 22	3345	80 33 42	3324	81 57 14	3324	83 20 58	3314
	$\alpha$ Pegasi W.	57 10 56	3169	58 37 42	3165	60 4 45	3142	61 32 4	3122
	Pollux E.	62 36 26	2976	61 5 43	2989	59 34 52	2965	58 3 55	2967
	Jupiter E.	91 39 41	3012	90 9 43	3005	88 39 36	2997	87 9 20	2989
	Venus E.	96 6 3	3221	94 42 16	3213	93 18 20	3206	91 54 16	3200
	Saturn E.	106 5 45	2998	104 35 30	2991	103 5 6	2984	101 34 33	2976
4	Fomalhaut W.	90 22 24	3289	91 47 12	3261	93 12 9	3253	94 37 16	3246
	$\alpha$ Pegasi W.	68 52 40	3054	70 21 34	3052	71 50 43	3039	73 20 7	3027
	$\alpha$ Arietis W.	25 22 0	2969	26 52 52	2980	28 24 7	2954	29 55 43	2919
	Pollux E.	50 26 59	2934	48 55 11	2916	47 23 13	2908	45 51 6	2903
	Jupiter E.	79 35 31	2948	78 4 13	2989	76 32 44	2980	75 1 3	2920
	Venus E.	84 51 35	3236	83 26 32	3247	82 1 18	3237	80 35 53	3228
	Regulus E.	87 12 50	2988	85 40 16	2980	84 7 31	2871	82 34 35	2861
	Saturn E.	93 59 17	2984	92 27 41	2926	90 55 55	2916	89 23 57	2906
5	$\alpha$ Pegasi W.	80 50 56	2965	82 21 52	2954	83 53 3	2941	85 24 30	2929
	$\alpha$ Arietis W.	37 38 28	2846	39 11 56	2832	40 45 42	2819	42 19 45	2804
	Pollux E.	38 8 24	2872	36 35 29	2806	35 2 27	2800	33 29 17	2856
	Jupiter E.	67 19 28	2968	65 46 28	2967	64 13 14	2946	62 39 46	2935
	Venus E.	73 25 45	3174	71 59 5	3163	70 32 11	3150	69 5 2	3128
	Regulus E.	74 46 43	2810	73 12 28	2799	71 37 59	2788	70 3 15	2775
	Saturn E.	81 40 55	2855	80 7 38	2844	78 34 7	2833	77 0 22	2821
	SUN E.	119 16 47	3179	117 50 13	3168	116 23 25	3164	114 56 21	3142
6	$\alpha$ Arietis W.	50 14 35	2735	51 50 29	2720	53 26 42	2705	55 3 14	2691
	Jupiter E.	54 48 31	2772	53 13 26	2759	51 38 4	2746	50 2 25	2732
	Venus E.	61 45 30	3073	60 16 47	3060	58 47 48	3044	57 18 30	3030
	Regulus E.	62 5 43	2715	60 29 23	2702	58 52 46	2689	57 15 51	2675
	Saturn E.	69 7 42	2760	67 32 22	2747	65 56 44	2734	64 20 49	2720
	SUN E.	107 37 2	3073	106 8 19	3069	104 39 19	3048	103 10 0	3029
7	$\alpha$ Arietis W.	63 10 54	2615	64 49 28	2601	66 28 22	2585	68 7 38	2569
	Aldebaran W.	31 43 36	2805	33 17 58	2773	34 53 1	2742	36 28 45	2717
	Jupiter E.	41 59 33	2662	40 22 2	2642	38 44 10	2622	37 5 59	2618
	Regulus E.	49 6 43	2806	47 27 56	2801	45 48 49	2677	44 9 22	2652
	Venus E.	49 47 33	2935	48 16 24	2940	46 44 56	2924	45 13 8	2909
	Saturn E.	56 16 40	2651	54 38 54	2636	53 0 48	2621	51 22 22	2607
	SUN E.	95 38 41	2950	94 7 26	2925	92 35 51	2918	91 3 55	2901
8	$\alpha$ Arietis W.	76 29 31	2487	78 11 2	2471	79 52 56	2455	81 35 12	2436



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
1	Mars W.	89 28 46	3184	90 55 2	3191	92 21 22	3188	93 47 46	3181
	$\alpha$ Aquilæ W.	87 52 22	3609	89 10 56	3606	90 29 36	3601	91 48 20	3608
	Fomalhaut W.	62 48 36	3605	64 8 55	3608	65 29 33	3471	66 50 29	3457
	Aldebaran E.	39 2 23	3108	37 35 35	3176	36 8 56	3183	34 42 26	3191
	Pollux E.	80 36 26	3086	79 6 58	3083	77 37 25	3028	76 7 47	3023
2	Mars W.	101 1 25	3166	102 28 28	3149	103 55 38	3140	105 22 56	3135
	Fomalhaut W.	73 39 9	3389	75 1 38	3378	76 24 20	3365	77 47 15	3366
	$\alpha$ Pegasi W.	51 26 56	3282	52 52 27	3216	54 18 18	3199	55 44 28	3184
	Pollux E.	68 38 7	3098	67 7 52	3088	65 37 30	2968	64 7 2	2981
	Jupiter E.	97 38 10	3088	96 8 44	3082	94 39 11	3026	93 9 30	3019
	Venus E.	101 39 54	3247	100 16 37	3341	98 53 13	3334	97 29 42	3228
3	Mars W.	112 41 27	3101	114 9 36	3093	115 37 54	3086	117 6 21	3078
	Fomalhaut W.	84 44 53	3304	86 9 0	3295	87 33 17	3286	88 57 45	3276
	$\alpha$ Pegasi W.	62 59 40	3115	64 27 31	3101	65 55 39	3089	67 24 2	3077
	Pollux E.	56 32 48	2961	55 1 34	2944	53 30 11	2987	51 58 39	2981
	Jupiter E.	85 38 54	2982	84 8 19	2974	82 37 34	2965	81 6 38	2967
	Venus E.	90 30 3	3291	89 5 41	3282	87 41 9	3274	86 16 27	3266
	Saturn E.	100 3 50	3098	98 32 57	2990	97 1 54	2982	95 30 41	2943
4	Fomalhaut W.	96 2 31	3228	97 27 55	3221	98 53 28	3224	100 19 9	3217
	$\alpha$ Pegasi W.	74 49 46	3015	76 19 40	3002	77 49 50	2989	79 20 16	2978
	$\alpha$ Arietis W.	31 27 38	2908	32 59 53	2898	34 32 27	2975	36 5 18	2960
	Pollux E.	44 18 51	2996	42 46 27	2989	41 13 54	2982	39 41 12	2977
	Jupiter E.	73 29 10	2910	71 57 4	2900	70 24 45	2891	68 52 14	2879
	Venus E.	79 10 17	3217	77 44 28	3207	76 18 27	3196	74 52 13	3184
	Regulus E.	81 1 26	2982	79 28 5	2942	77 54 31	2931	76 20 44	2921
	Saturn E.	87 51 46	2986	86 19 23	2987	84 46 46	2977	83 13 58	2966
5	$\alpha$ Pegasi W.	86 56 12	2916	88 28 10	2904	90 0 24	2901	91 32 54	2879
	$\alpha$ Arietis W.	43 54 7	2791	45 28 47	2777	47 3 45	2763	48 39 1	2750
	Pollux E.	31 56 1	2980	30 22 38	2946	28 49 9	2940	27 15 33	2936
	Jupiter E.	61 6 3	2922	59 32 4	2911	57 57 50	2798	56 23 19	2786
	Venus E.	67 37 39	3126	66 10 0	3113	64 42 6	3100	63 13 56	3087
	Regulus E.	68 28 16	2765	66 53 2	2753	65 17 32	2741	63 41 46	2738
	Saturn E.	75 26 22	2909	73 52 6	2798	72 17 35	2785	70 42 47	2773
	SUN E.	113 29 2	3128	112 1 26	3116	110 33 35	3101	109 5 27	3087
6	$\alpha$ Arietis W.	56 40 6	2676	58 17 18	2661	59 54 50	2646	61 32 42	2632
	Jupiter E.	48 26 28	2718	46 50 12	2704	45 13 38	2690	43 36 45	2676
	Venus E.	55 48 56	3016	54 19 3	3001	52 48 52	2986	51 18 22	2971
	Regulus E.	55 38 39	2668	54 1 9	2648	52 23 19	2634	50 45 10	2621
	Saturn E.	62 44 36	2706	61 8 4	2698	59 31 15	2679	57 54 7	2665
	SUN E.	101 40 23	3014	100 10 27	2997	98 40 11	2981	97 9 35	2967
7	$\alpha$ Arietis W.	69 47 16	2682	71 27 17	2637	73 7 39	2620	74 48 24	2604
	Aldebaran W.	38 5 8	2698	39 42 7	2680	41 19 41	2635	42 57 49	2611
	Jupiter E.	35 27 28	2698	33 48 37	2688	32 9 26	2573	30 29 54	2569
	Regulus E.	42 29 35	2646	40 49 27	2632	39 8 58	2517	37 28 9	2502
	Venus E.	43 41 0	2802	42 8 31	2876	40 35 42	2880	39 2 32	2844
	Saturn E.	49 43 37	2692	48 4 31	2678	46 25 6	2663	44 45 20	2640
	SUN E.	89 31 38	2894	87 58 59	2868	86 25 59	2851	84 52 37	2834
8	$\alpha$ Arietis W.	83 17 52	2422	85 0 55	2406	86 44 22	2389	88 28 13	2373



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dif.	III <sup>h</sup> .	P. L. of Dif.	VI <sup>h</sup> .	P. L. of Dif.	IX <sup>h</sup> .	P. L. of Dif.
8	Aldebaran W.	<sup>o</sup> 44 <sup>'</sup> 36 <sup>"</sup> 29	2568	<sup>o</sup> 46 <sup>'</sup> 15 <sup>"</sup> 41	2565	<sup>o</sup> 47 <sup>'</sup> 55 <sup>"</sup> 24	2543	<sup>o</sup> 49 <sup>'</sup> 35 <sup>"</sup> 38	2522
	Regulus E.	35 46 59	2480	34 5 29	2473	32 23 38	2459	30 41 27	2445
	Venus E.	37 29 1	2627	35 55 8	2611	34 20 55	2795	32 46 21	2779
	Saturn E.	43 5 15	2635	41 24 50	2590	39 44 4	2505	38 2 58	2492
	SUN E.	83 18 53	2617	81 44 47	2790	80 10 18	2782	78 35 26	2765
9	$\alpha$ Arietis W.	90 12 27	2857	91 57 4	2841	93 42 5	2824	95 27 30	2808
	Aldebaran W.	58 4 7	2420	59 47 13	2401	61 30 46	2392	63 14 46	2364
	Saturn E.	29 32 54	2431	27 50 3	2422	26 6 59	2414	24 23 44	2410
	SUN E.	70 35 24	2678	68 58 15	2660	67 20 42	2644	65 42 47	2628
10	$\alpha$ Arietis W.	104 20 19	2231	106 8 0	2217	107 56 2	2202	109 44 26	2188
	Aldebaran W.	72 1 16	2278	73 47 48	2262	75 34 44	2245	77 22 4	2231
	Pollux W.	29 51 2	2307	31 36 51	2288	33 23 16	2261	35 10 13	2249
	SUN E.	57 27 36	2547	55 47 28	2533	54 7 0	2518	52 26 12	2504
11	Aldebaran W.	86 24 3	2163	88 13 26	2151	90 3 8	2139	91 53 7	2126
	Pollux W.	44 12 11	2162	46 1 51	2138	47 51 52	2124	49 42 15	2111
	SUN E.	43 57 30	2443	42 14 55	2432	40 32 6	2422	38 49 3	2415
16	SUN W.	26 49 38	2540	28 29 55	2549	30 10 0	2559	31 49 51	2571
	$\alpha$ Aquilæ E.	75 4 42	2792	73 30 3	2820	71 56 1	2848	70 22 35	2879
	Mars E.	78 25 3	2333	76 39 51	2348	74 55 1	2364	73 10 37	2381
	Fomalhaut E.	99 32 22	2556	97 52 26	2605	96 12 45	2675	94 33 20	2692
17	SUN W.	40 4 41	2644	41 42 36	2659	43 20 9	2678	44 57 18	2696
	$\alpha$ Aquilæ E.	62 46 10	2607	61 17 20	3111	59 49 24	3169	58 22 26	3209
	Mars E.	64 34 45	2473	62 51 54	2492	61 11 29	2511	59 30 31	2531
	Fomalhaut E.	86 21 36	2690	84 44 29	2699	83 7 48	2730	81 31 35	2743
18	SUN W.	52 56 56	2791	54 31 36	2810	56 5 51	2830	57 39 40	2849
	Mars E.	51 12 40	2632	49 34 29	2658	47 56 46	2675	46 19 32	2695
	Fomalhaut E.	73 38 11	2666	72 5 9	2694	70 32 42	2692	69 0 51	2661
	$\alpha$ Pegasi E.	94 11 43	2593	92 32 39	2612	90 54 1	2631	89 15 48	2651
19	SUN W.	65 22 26	2948	66 53 44	2965	68 24 38	2986	69 55 8	3006
	Antares W.	23 56 56	2598	25 36 7	2607	27 14 52	2625	28 53 13	2643
	Mars E.	38 20 24	2801	36 45 58	2822	35 12 0	2844	33 38 29	2866
	Fomalhaut E.	61 31 13	3114	60 3 20	3180	58 36 11	3186	57 9 48	3236
	$\alpha$ Pegasi E.	81 11 15	2749	79 35 40	2768	78 0 30	2796	76 25 47	2806
20	SUN W.	77 21 47	3098	78 49 59	3116	80 17 50	3133	81 45 19	3149
	Antares W.	36 59 5	2729	38 35 7	2744	40 10 48	2760	41 46 8	2776
	Fomalhaut E.	50 10 4	3454	48 48 49	3506	47 28 32	3563	46 9 17	3623
	$\alpha$ Pegasi E.	68 38 47	2911	67 6 42	2962	65 35 4	2983	64 3 52	2973
21	SUN W.	88 57 50	3231	90 23 23	3245	91 48 39	3260	93 13 39	3273
	Antares W.	49 37 46	2860	51 11 9	2963	52 44 15	2976	54 17 4	2989
	$\alpha$ Pegasi E.	56 34 30	3062	55 5 59	3106	53 37 55	3127	52 10 18	3152
	$\alpha$ Arietis E.	98 18 16	2966	96 45 14	2980	95 12 29	2992	93 40 0	2996
22	SUN W.	100 14 45	3336	101 38 15	3347	103 1 32	3356	104 24 37	3369
	Antares W.	61 57 17	2946	63 28 37	2967	64 59 44	2986	66 30 39	2976
	$\alpha$ Pegasi E.	44 59 39	3261	43 35 5	3310	42 11 5	3342	40 47 42	3374
	$\alpha$ Arietis E.	86 1 28	2963	84 30 29	2973	82 59 43	2992	81 29 8	2998



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
8	Aldebaran W.	51 16 21	2429	52 57 35	2479	54 39 18	2460	56 21 28	2439
	Regulus E.	28 58 56	2431	27 16 6	2418	25 32 57	2405	23 49 30	2394
	Venus E.	31 11 25	2763	29 36 9	2747	28 0 32	2732	26 24 34	2718
	Saturn E.	36 21 34	2478	34 39 50	2465	32 57 48	2453	31 15 29	2442
	SUN E.	77 0 12	2747	75 24 35	2739	73 48 34	2713	72 12 11	2696
9	$\alpha$ Arietis W.	97 13 18	2291	98 59 30	2277	100 46 4	2262	102 33 0	2246
	Aldebaran W.	64 59 13	2245	66 44 7	2228	68 29 26	2211	70 15 9	2195
	Saturn E.	22 40 23	2407	20 57 0	2409	19 13 38	2414	17 30 23	2423
	SUN E.	64 4 30	2611	62 25 50	2608	60 46 46	2679	59 7 22	2663
10	$\alpha$ Arietis W.	111 33 11	2175	113 22 16	2162	115 11 41	2150	117 1 24	2137
	Aldebaran W.	79 9 45	2216	80 57 48	2202	82 46 12	2188	84 34 58	2176
	Pollux W.	36 57 42	2220	38 45 39	2201	40 34 5	2185	42 22 55	2168
	SUN E.	50 45 4	2490	49 3 37	2477	47 21 52	2465	45 39 49	2453
11	Aldebaran W.	93 43 23	2118	95 33 54	2109	97 24 39	2100	99 15 38	2094
	Pollux W.	51 39 57	2098	53 23 59	2087	55 15 18	2075	57 6 55	2068
	SUN E.	37 5 49	2407	35 22 24	2400	33 38 49	2396	31 55 8	2393
16	SUN W.	33 29 28	2683	35 8 45	2697	36 47 44	2612	38 26 23	2627
	$\alpha$ Aquilæ E.	68 49 49	2912	67 17 45	2947	65 46 26	3000	64 15 53	3024
	Mars E.	71 26 35	2400	69 43 0	2417	67 59 49	2435	66 17 4	2454
	Fomalhaut E.	92 54 14	2608	91 15 30	2634	89 37 8	2641	87 59 9	2660
17	SUN W.	46 34 3	2715	48 10 23	2733	49 46 19	2752	51 21 50	2771
	$\alpha$ Aquilæ E.	56 56 28	2823	55 31 33	2820	54 7 45	2832	52 45 8	2846
	Mars E.	57 50 1	2651	56 10 0	2671	54 30 25	2691	52 51 18	2612
	Fomalhaut E.	79 55 52	2765	78 20 38	2789	76 45 56	2814	75 11 46	2841
18	SUN W.	59 13 4	2669	60 46 2	2689	62 18 35	2909	63 50 43	2923
	Mars E.	44 42 47	2716	43 6 29	2738	41 30 39	2769	39 55 17	2781
	Fomalhaut E.	67 29 37	2682	65 59 2	2613	64 29 5	2646	62 59 49	2678
	$\alpha$ Pegasi E.	87 38 2	2669	86 0 41	2689	84 23 46	2708	82 47 17	2729
19	SUN W.	71 25 14	3025	72 54 56	3043	74 24 15	3060	75 53 12	3079
	Antares W.	30 31 10	2680	32 8 44	2678	33 45 53	2696	35 22 40	2711
	Mars E.	32 5 26	2688	30 32 52	2910	29 0 46	2932	27 29 8	2955
	Fomalhaut E.	55 44 10	2369	54 19 22	3311	52 55 23	3357	51 32 17	3403
	$\alpha$ Pegasi E.	74 51 30	2829	73 17 40	2849	71 44 16	2899	70 11 18	2991
20	SUN W.	83 12 29	3167	84 39 18	3182	86 5 47	3198	87 31 58	3214
	Antares W.	43 21 7	2792	44 55 45	2907	46 30 4	2921	48 4 4	2935
	Fomalhaut E.	44 51 7	2687	43 34 6	2756	42 18 17	2830	41 3 46	2910
	$\alpha$ Pegasi E.	62 33 6	2995	61 2 47	3016	59 32 54	3039	58 3 29	3060
21	SUN W.	94 38 23	3286	96 2 51	3299	97 27 4	3312	98 51 2	3325
	Antares W.	55 49 37	2901	57 21 54	2913	58 53 57	2925	60 25 44	2938
	$\alpha$ Pegasi E.	50 43 11	3176	49 16 33	3200	47 50 24	3226	46 24 46	3233
	$\alpha$ Arietis E.	92 7 47	2917	90 35 50	2929	89 4 8	2941	87 32 41	2952
22	SUN W.	105 47 29	3379	107 10 9	3386	108 32 39	3397	109 54 59	3406
	Antares W.	68 1 22	2995	69 31 53	2998	71 2 14	3001	72 32 26	3009
	$\alpha$ Pegasi E.	39 24 56	3410	38 2 51	3450	36 41 28	3490	35 20 53	3535
	$\alpha$ Arietis E.	79 58 46	3001	78 28 35	3010	76 58 35	3018	75 28 45	3027



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
23	SUN	W.	111 17 9	3416	112 39 9	3428	114 1 0	3439	115 22 44	3457
	Antares	W.	74 2 27	3017	75 32 19	3028	77 2 3	3029	78 31 40	3036
	$\alpha$ Arietis	E.	73 59 6	3084	72 29 35	3041	71 0 13	3048	69 31 0	3054
24	SUN	W.	122 9 32	3464	123 30 36	3470	124 51 34	3474	126 12 27	3478
	Antares	W.	85 57 59	3069	87 26 59	3068	88 55 54	3065	90 24 46	3069
	Mars	W.	21 19 42	3348	22 42 58	3344	24 6 19	3341	25 29 43	3336
	$\alpha$ Arietis	E.	62 6 39	3080	60 38 5	3086	59 9 37	3088	57 41 13	3091
	Aldebaran	E.	94 34 56	3117	93 7 7	3119	91 39 21	3123	90 11 39	3126
25	Antares	W.	97 48 23	3077	99 17 1	3077	100 45 39	3078	102 14 16	3078
	$\alpha$ Aquilæ	W.	50 6 50	4186	51 15 58	4112	52 25 48	4071	53 36 18	4084
	Mars	W.	32 27 22	3330	33 50 59	3328	35 14 38	3326	36 38 19	3326
	$\alpha$ Arietis	E.	50 20 9	3106	48 52 5	3106	47 24 4	3109	45 56 5	3110
	Aldebaran	E.	82 53 49	3124	81 26 21	3126	79 58 55	3127	78 31 30	3127
26	$\alpha$ Aquilæ	W.	59 37 13	3881	60 50 52	3886	62 4 57	3892	63 19 26	3810
	Mars	W.	43 37 16	3314	45 1 11	3311	46 25 10	3309	47 49 12	3306
	$\alpha$ Arietis	E.	38 36 35	3117	37 8 46	3117	35 40 57	3119	34 13 11	3121
	Aldebaran	E.	71 14 26	3126	69 47 0	3126	68 19 34	3125	66 52 7	3123
	Pollux	E.	113 18 14	3102	111 50 7	3099	110 21 56	3095	108 53 42	3094
27	$\alpha$ Aquilæ	W.	69 37 11	3716	70 53 41	3700	72 10 28	3686	73 27 30	3672
	Mars	W.	54 50 21	3267	56 14 48	3262	57 39 19	3278	59 3 56	3274
	Fomalhaut	W.	44 42 1	3605	45 55 15	3600	47 9 16	3619	48 23 59	3778
	Aldebaran	E.	59 34 31	3126	58 6 55	3127	56 39 18	3126	55 11 40	3126
	Pollux	E.	101 31 35	3076	100 2 56	3073	98 34 14	3068	97 5 25	3065
28	$\alpha$ Aquilæ	W.	79 56 12	3611	81 14 34	3602	82 33 6	3592	83 51 49	3584
	Mars	W.	66 8 26	3248	67 33 38	3243	68 58 56	3227	70 24 21	3221
	Fomalhaut	W.	54 47 1	3630	56 5 14	3626	57 23 56	3620	58 43 4	3646
	Aldebaran	E.	47 53 12	3121	46 25 28	3122	44 57 46	3123	43 30 3	3124
	Pollux	E.	89 40 2	3040	88 10 39	3026	86 41 10	3021	85 11 36	3026
29	Mars	W.	77 33 11	3201	78 59 19	3195	80 25 34	3186	81 51 58	3182
	Fomalhaut	W.	65 24 39	3446	66 46 1	3421	68 7 43	3415	69 29 42	3408
	$\alpha$ Pegasi	W.	42 58 53	3313	44 22 50	3298	45 47 15	3265	47 12 7	3245
	Aldebaran	E.	36 12 12	3123	34 44 54	3149	33 17 44	3169	31 50 46	3171
	Pollux	E.	77 42 0	2997	76 11 44	2991	74 41 20	2986	73 10 50	2981
30	Jupiter	E.	110 45 48	3022	109 16 3	3017	107 46 11	3010	106 16 11	3003
	Mars	W.	89 5 53	3148	90 33 5	3141	92 0 25	3133	93 27 54	3127
	Fomalhaut	W.	76 23 43	3333	77 47 16	3322	79 11 9	3312	80 35 0	3300
	$\alpha$ Pegasi	W.	54 22 10	3156	55 49 13	3140	57 16 34	3126	58 44 13	3111
	Pollux	E.	65 36 28	2980	64 5 13	2946	62 33 51	2936	61 2 20	2923
31	Jupiter	E.	98 44 2	2969	97 13 11	2962	95 42 11	2956	94 11 3	2946
	Saturn	E.	111 44 6	2985	110 13 11	2958	108 42 6	2951	107 10 52	2944
	Mars	W.	100 47 29	3090	102 15 51	3082	103 44 22	3074	105 13 3	3067
	$\alpha$ Pegasi	W.	66 6 32	3047	67 35 46	3036	69 5 14	3026	70 34 56	3014
	$\alpha$ Arietis	W.	22 31 52	2970	24 2 42	2952	25 33 55	2934	27 5 31	2917
	Pollux	E.	53 22 56	2904	51 50 42	2898	50 18 20	2892	48 45 51	2887
	Jupiter	E.	86 33 1	2911	85 0 56	2908	83 26 41	2906	81 56 17	2896
	Regulus	E.	90 9 24	2908	88 36 24	2901	87 3 15	2894	85 29 57	2886
	Saturn	E.	99 32 22	2907	98 0 12	2909	96 27 52	2901	94 55 21	2893



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
23	SUN W.	118 44 19	3443	118 5 47	3449	119 27 8	3454	120 48 23	3460
	Antares W.	80 1 8	3041	81 30 30	3045	82 59 46	3050	84 28 54	3055
	$\alpha$ Arietis E.	68 1 54	3050	68 32 56	3055	65 4 3	3071	63 35 18	3076
24	SUN W.	127 33 16	3481	128 54 1	3484	130 14 43	3488	131 35 21	3491
	Antares W.	91 53 34	3071	93 23 19	3073	94 51 2	3074	96 19 43	3075
	Mars W.	26 53 11	3286	28 16 41	3285	29 40 19	3282	31 3 46	3281
	$\alpha$ Arietis E.	56 12 53	3056	54 44 37	3058	53 16 25	3101	51 48 16	3102
	Aldebaran E.	88 44 0	3128	87 16 24	3129	85 48 50	3122	84 21 19	3123
25	Antares W.	103 42 53	3077	105 11 31	3076	106 40 10	3075	108 8 50	3075
	$\alpha$ Aquilæ W.	54 47 24	3299	55 59 5	3298	57 11 18	3296	58 24 1	3296
	Mars W.	38 2 1	3223	39 25 46	3220	40 49 34	3219	42 13 24	3217
	$\alpha$ Arietis E.	44 28 8	3112	43 0 13	3113	41 32 19	3114	40 4 27	3114
	Aldebaran E.	77 4 5	3127	75 36 40	3127	74 9 16	3127	72 41 51	3127
26	$\alpha$ Aquilæ W.	64 34 18	3780	65 49 31	3780	67 5 5	3780	68 21 59	3783
	Mars W.	49 13 17	3301	50 37 27	3298	52 1 41	3294	53 25 59	3291
	$\alpha$ Arietis E.	32 45 27	3123	31 17 45	3125	29 50 6	3129	28 22 31	3123
	Aldebaran E.	65 24 38	3123	63 57 9	3123	62 29 38	3120	61 2 5	3129
	Pollux E.	107 25 25	3091	105 57 4	3087	104 28 38	3084	103 0 9	3080
27	$\alpha$ Aquilæ W.	74 44 47	3658	76 2 19	3646	77 20 4	3634	78 38 2	3623
	Mars W.	60 28 38	3298	61 53 27	3295	63 18 20	3292	64 43 20	3288
	Fomalhaut W.	49 39 24	3743	50 55 27	3708	52 12 6	3677	53 29 17	3647
	Aldebaran E.	53 44 1	3124	52 16 20	3123	50 48 38	3122	49 20 55	3122
	Pollux E.	95 36 32	3060	94 7 33	3045	92 38 28	3062	91 9 19	3045
28	$\alpha$ Aquilæ W.	85 10 41	3576	86 29 42	3567	87 48 52	3560	89 8 10	3554
	Mars W.	71 49 53	3226	73 15 32	3220	74 41 18	3214	76 7 11	3206
	Fomalhaut W.	60 2 37	3224	61 22 35	3203	62 42 56	3184	64 3 38	3167
	Aldebaran E.	42 2 22	3126	40 34 43	3129	39 7 9	3123	37 39 38	3126
	Pollux E.	83 41 54	3019	82 12 5	3014	80 42 10	3009	79 12 9	3008
29	Mars W.	83 18 29	3175	84 45 8	3168	86 11 55	3162	87 38 50	3155
	Fomalhaut W.	70 51 58	3286	72 14 31	3272	73 37 20	3266	75 0 24	3246
	$\alpha$ Pegasi W.	48 37 23	3225	50 3 2	3206	51 29 4	3188	52 55 27	3173
	Aldebaran E.	30 24 2	3126	28 57 35	3292	27 31 28	3225	26 5 48	3222
	Pollux E.	71 40 13	3074	70 9 28	3060	68 38 35	3062	67 7 35	3057
	Jupiter E.	104 46 2	2997	103 15 45	2989	101 45 19	2983	100 14 45	2976
30	Mars W.	94 55 31	3112	96 23 17	3112	97 51 12	3105	99 19 16	3097
	Fomalhaut W.	81 59 11	3220	83 23 34	3222	84 48 7	3272	86 12 51	3263
	$\alpha$ Pegasi W.	60 12 9	3068	61 40 21	3085	63 8 49	3072	64 37 33	3060
	Pollux E.	59 30 42	2927	57 58 57	2920	56 27 4	2914	54 55 4	2908
	Jupiter E.	92 39 45	2941	91 8 18	2934	89 36 42	2926	88 4 56	2919
	Saturn E.	105 39 29	2926	104 7 56	2929	102 36 14	2922	101 4 23	2914
31	Mars W.	106 41 53	3080	108 10 52	3092	109 40 1	3044	111 9 19	3035
	$\alpha$ Pegasi W.	72 4 51	3008	73 35 0	2993	75 5 22	2982	76 35 57	2972
	$\alpha$ Arietis W.	28 37 28	2902	30 9 44	2888	31 42 18	2875	33 15 9	2862
	Pollux E.	47 13 15	2881	45 40 32	2876	44 7 43	2872	42 34 48	2868
	Jupiter E.	80 23 43	2890	78 50 59	2873	77 18 5	2866	75 45 1	2857
	Regulus E.	83 56 29	2828	82 22 51	2831	80 49 3	2828	79 15 5	2815
	Saturn E.	93 22 41	2876	91 49 51	2868	90 16 51	2860	88 43 41	2852



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		h. m. s.	s.		° ' "	"					
Thur.	1	14 27 37.93	9.814	S. 14 36 23.1	47.82	16 10.06	67.01	16 18.21	0.042		
Fri.	2	14 31 33.86	9.848	14 55 23.9	47.22	16 10.30	67.12	16 18.83	0.008		
Sat.	3	14 35 30.63	9.883	15 14 10.1	46.61	16 10.54	67.24	16 18.62	0.027		
Sun.	4	14 39 28.24	9.918	15 32 41.5	45.98	16 10.78	67.36	16 17.56	0.062		
Mon.	5	14 43 26.70	9.953	15 50 57.7	45.33	16 11.01	67.48	16 15.66	0.097		
Tues.	6	14 47 26.01	9.989	16 8 58.2	44.67	16 11.24	67.59	16 12.92	0.132		
Wed.	7	14 51 26.16	10.025	16 26 42.4	43.99	16 11.47	67.71	16 9.34	0.167		
Thur.	8	14 55 27.17	10.061	16 44 10.0	43.29	16 11.70	67.83	16 4.90	0.203		
Fri.	9	14 59 29.04	10.097	17 1 20.7	42.57	16 11.92	67.95	15 59.60	0.239		
Sat.	10	15 3 31.77	10.132	17 18 13.9	41.84	16 12.14	68.07	15 53.43	0.275		
Sun.	11	15 7 35.37	10.168	17 34 49.5	41.09	16 12.36	68.19	15 46.39	0.311		
Mon.	12	15 11 39.85	10.204	17 51 6.8	40.32	16 12.58	68.31	15 38.49	0.347		
Tues.	13	15 15 45.19	10.239	18 7 5.4	39.53	16 12.80	68.43	15 29.74	0.383		
Wed.	14	15 19 51.37	10.274	18 22 44.8	38.72	16 13.01	68.55	15 20.15	0.418		
Thur.	15	15 23 58.39	10.309	18 38 4.7	37.90	16 13.22	68.67	15 9.71	0.453		
Fri.	16	15 28 6.25	10.343	18 53 4.9	37.07	16 13.44	68.79	14 58.43	0.487		
Sat.	17	15 32 14.95	10.377	19 7 44.7	36.22	16 13.65	68.91	14 46.32	0.522		
Sun.	18	15 36 24.47	10.411	19 22 3.9	35.35	16 13.85	69.03	14 33.40	0.556		
Mon.	19	15 40 34.79	10.444	19 36 2.1	34.47	16 14.05	69.14	14 19.68	0.589		
Tues.	20	15 44 45.90	10.477	19 49 38.9	33.57	16 14.24	69.25	14 5.17	0.621		
Wed.	21	15 48 57.79	10.510	20 2 54.1	32.66	16 14.44	69.36	13 49.87	0.654		
Thur.	22	15 53 10.46	10.542	20 15 47.2	31.73	16 14.63	69.47	13 33.79	0.686		
Fri.	23	15 57 23.92	10.574	20 28 17.8	30.79	16 14.82	69.58	13 16.94	0.718		
Sat.	24	16 1 38.14	10.606	20 40 25.5	29.83	16 15.00	69.68	12 59.34	0.750		
Sun.	25	16 5 53.10	10.637	20 52 10.1	28.85	16 15.18	69.78	12 40.99	0.781		
Mon.	26	16 10 8.80	10.667	21 3 31.4	27.88	16 15.35	69.88	12 21.90	0.811		
Tues.	27	16 14 25.21	10.696	21 14 28.9	26.88	16 15.52	69.98	12 2.09	0.840		
Wed.	28	16 18 42.34	10.725	21 25 2.4	25.87	16 15.68	70.08	11 41.58	0.869		
Thur.	29	16 23 0.16	10.754	21 35 11.4	24.85	16 15.84	70.18	11 20.38	0.898		
Fri.	30	16 27 18.65	10.782	21 44 55.7	23.82	16 15.99	70.27	10 58.50	0.926		
Sat.	31	16 31 37.81	10.809	S. 21 54 15.3	22.78	16 16.14	70.36	10 35.95	0.953		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time.			
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.								
		h.	m.	s.	s.	°	'	"	"			m.	s.	s.	h.
Thur.	1	14	27	40.59	9.814	S. 14	36	36.1	47.82	16	18.22	0.042	14	43	58.81
Fri.	2	14	31	36.53	9.848	14	55	36.8	47.22	16	18.83	0.008	14	47	55.36
Sat.	3	14	35	33.31	9.883	15	14	22.8	46.61	16	18.61	0.027	14	51	51.92
Sun.	4	14	39	30.93	9.918	15	32	54.0	45.98	16	17.54	0.062	14	55	48.47
Mon.	5	14	43	29.39	9.953	15	51	10.0	45.33	16	15.64	0.097	14	59	45.03
Tues.	6	14	47	28.69	9.989	16	9	10.3	44.67	16	12.89	0.132	15	3	41.58
Wed.	7	14	51	28.84	10.025	16	26	54.3	43.99	16	9.30	0.167	15	7	38.14
Thur.	8	14	55	29.85	10.061	16	44	21.7	43.29	16	4.85	0.203	15	11	34.70
Fri.	9	14	59	31.72	10.097	17	1	32.1	42.57	15	59.53	0.239	15	15	31.25
Sat.	10	15	3	34.45	10.132	17	18	25.0	41.84	15	53.36	0.275	15	19	27.81
Sun.	11	15	7	38.05	10.168	17	35	0.3	41.09	15	46.32	0.311	15	23	24.37
Mon.	12	15	11	42.51	10.204	17	51	17.3	40.32	15	38.41	0.347	15	27	20.92
Tues.	13	15	15	47.83	10.239	18	7	15.6	39.53	15	29.65	0.383	15	31	17.48
Wed.	14	15	19	53.99	10.274	18	22	54.7	38.72	15	20.05	0.418	15	35	14.04
Thur.	15	15	24	0.99	10.309	18	38	14.3	37.90	15	9.60	0.453	15	39	10.59
Fri.	16	15	28	8.83	10.343	18	53	14.2	37.07	14	58.32	0.487	15	43	7.15
Sat.	17	15	32	17.50	10.377	19	7	53.7	36.22	14	46.21	0.522	15	47	3.71
Sun.	18	15	36	26.99	10.411	19	22	12.6	35.35	14	33.27	0.556	15	51	0.26
Mon.	19	15	40	37.28	10.444	19	36	10.4	34.47	14	19.54	0.589	15	54	56.82
Tues.	20	15	44	48.35	10.477	19	49	46.8	33.57	14	5.02	0.621	15	58	53.37
Wed.	21	15	49	0.21	10.510	19	3	1.6	32.66	13	49.72	0.654	16	2	49.93
Thur.	22	15	53	12.84	10.542	20	15	54.3	31.78	13	33.65	0.686	16	6	46.49
Fri.	23	15	57	26.25	10.574	20	28	24.5	30.79	13	16.79	0.718	16	10	43.04
Sat.	24	16	1	40.42	10.606	20	40	31.9	29.83	12	59.18	0.750	16	14	39.60
Sun.	25	16	5	55.34	10.637	20	52	16.2	28.85	12	40.82	0.781	16	18	36.16
Mon.	26	16	10	10.99	10.667	21	3	37.1	27.88	12	21.72	0.811	16	22	32.71
Tues.	27	16	14	27.35	10.696	21	14	34.2	26.88	12	1.92	0.840	16	26	29.27
Wed.	28	16	18	44.42	10.725	21	25	7.4	25.87	11	41.41	0.869	16	30	25.83
Thur.	29	16	23	2.18	10.754	21	35	16.1	24.85	11	20.21	0.898	16	34	22.39
Fri.	30	16	27	20.62	10.782	21	45	0.1	23.82	10	58.33	0.926	16	38	18.95
Sat.	31	16	31	39.72	10.809	S. 21	54	19.4	22.78	10	35.78	0.953	16	42	15.50

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## AT GREENWICH MEAN NOON.

THE SUN'S										Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
Day of the Month.	Day of the Year.	True LONGITUDE.		Dist. for 1 hour.	LATITUDE.							
		$\lambda$	$\lambda'$									
1	306	219 19 28.5	18 32.5	150.26	+0.30	9.9963749	45.4	9 14 30.10				
2	307	220 19 35.8	18 39.7	150.31	0.19	.9962665	44.8	9 10 34.19				
3	308	221 19 45.1	18 48.9	150.42	+0.06	.9961596	44.2	9 6 38.28				
4	309	222 19 56.4	19 0.1	150.51	-0.07	.9960542	43.6	9 2 42.37				
5	310	223 20 9.7	19 13.2	150.60	0.21	.9959502	43.0	8 58 46.46				
6	311	224 20 25.1	19 28.4	150.69	0.34	.9958474	42.5	8 54 50.55				
7	312	225 20 42.6	19 45.8	150.78	0.47	.9957457	42.1	8 50 54.64				
8	313	226 21 2.1	20 5.2	150.87	0.57	.9956451	41.7	8 46 58.73				
9	314	227 21 23.5	20 26.5	150.95	0.65	.9955455	41.3	8 43 2.82				
10	315	228 21 46.9	20 49.7	151.02	0.68	.9954466	40.9	8 39 6.91				
11	316	229 22 12.1	21 14.7	151.09	0.68	.9953486	40.6	8 35 11.00				
12	317	230 22 39.2	21 41.7	151.16	0.67	.9952514	40.3	8 31 15.09				
13	318	231 23 7.9	22 10.3	151.23	0.63	.9951551	40.0	8 27 19.18				
14	319	232 23 38.2	22 40.4	151.29	0.55	.9950597	39.7	8 23 23.27				
15	320	233 24 10.0	23 12.0	151.35	0.45	.9949651	39.3	8 19 27.36				
16	321	234 24 43.2	23 45.0	151.41	0.35	.9948715	38.8	8 15 31.45				
17	322	235 25 17.8	24 19.5	151.46	0.23	.9947789	38.3	8 11 35.54				
18	323	236 25 53.6	24 55.2	151.51	-0.10	.9946875	37.8	8 7 39.63				
19	324	237 26 30.6	25 32.0	151.56	+0.03	.9945974	37.2	8 3 43.72				
20	325	238 27 8.8	26 10.0	151.61	0.15	.9945087	36.6	7 59 47.81				
21	326	239 27 48.1	26 49.1	151.66	0.25	.9944216	35.9	7 55 51.90				
22	327	240 28 28.6	27 29.5	151.70	0.34	.9943362	35.1	7 51 55.99				
23	328	241 29 10.2	28 11.0	151.75	0.40	.9942527	34.2	7 48 0.08				
24	329	242 29 52.9	28 53.5	151.80	0.42	.9941712	33.3	7 44 4.16				
25	330	243 30 36.7	29 37.1	151.85	0.42	.9940920	32.4	7 40 8.25				
26	331	244 31 21.7	30 21.9	151.90	0.39	.9940151	31.5	7 36 12.34				
27	332	245 32 7.8	31 7.9	151.95	0.32	.9939406	30.5	7 32 16.43				
28	333	246 32 55.0	31 54.9	152.00	0.23	.9938685	29.5	7 28 20.52				
29	334	247 33 43.4	32 43.1	152.05	+0.11	.9937988	28.5	7 24 24.60				
30	335	248 34 33.1	33 32.6	152.10	-0.02	.9937315	27.5	7 20 28.69				
31	336	249 35 24.1	34 23.4	152.15	-0.15	9.9936666	26.5	7 16 32.78				

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.

## SEMI-DIAMETER.

## HORIZONTAL PARALLAX.

## MERIDIAN PASSAGE.

## AGE.

Noon.

Midnight.

Noon.

Diff. for  
1 hour.

Midnight.

Diff. for  
1 hour.

h. m.

m.

m.

d.

Day of the Month.	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.	h. m.	m.	d.
1	15 12.4	15 16.3	55 41.9	+1.16	55 56.2	+1.22	14 19.1	2.26	17.9
2	15 20.4	15 24.7	56 11.3	1.29	56 27.2	1.35	15 14.1	2.29	18.9
3	15 29.3	15 34.0	56 43.8	1.41	57 1.1	1.47	16 9.0	2.26	19.9
4	15 38.9	15 43.9	57 19.1	1.52	57 37.6	1.56	17 2.7	2.20	20.9
5	15 49.1	15 54.3	57 56.6	1.59	58 15.9	1.61	17 54.7	2.13	21.9
6	15 59.6	16 4.9	58 35.4	1.62	58 54.6	1.59	18 45.1	2.08	22.9
7	16 10.0	16 14.9	59 13.4	1.53	59 31.3	1.43	19 34.8	2.07	23.9
8	16 19.4	16 23.4	59 47.8	1.30	60 2.5	1.12	20 24.8	2.11	24.9
9	16 26.7	16 29.3	60 14.8	0.91	60 24.3	0.66	21 16.2	2.19	25.9
10	16 31.0	16 31.8	60 30.6	+0.38	60 33.4	+0.08	22 10.1	2.31	26.9
11	16 31.5	16 30.2	60 32.4	-0.24	60 27.6	-0.57	23 7.2	2.43	27.9
12	16 27.8	16 24.4	60 18.8	0.88	60 6.3	1.19	6		28.9
13	16 20.0	16 14.8	59 50.2	1.47	59 31.0	1.70	0 7.1	2.52	0.5
14	16 8.8	16 2.3	59 9.2	1.91	58 45.2	2.06	1 8.5	2.54	1.5
15	15 55.4	15 48.2	58 19.8	2.15	57 53.5	2.20	2 9.0	2.45	2.5
16	15 41.0	15 33.8	57 27.0	2.21	57 0.6	2.16	3 6.5	2.30	3.5
17	15 26.9	15 20.3	56 35.2	2.07	56 10.9	1.96	3 59.7	2.12	4.5
18	15 14.2	15 8.5	55 48.3	1.81	55 27.5	1.64	4 48.4	1.95	5.5
19	15 3.5	14 59.0	55 9.0	1.45	54 52.8	1.25	5 33.2	1.80	6.5
20	14 55.3	14 52.3	54 39.1	1.08	54 28.0	0.82	6 15.2	1.71	7.5
21	14 49.9	14 48.3	54 19.4	0.61	54 13.4	-0.40	6 55.5	1.66	8.5
22	14 47.4	14 47.1	54 9.9	-0.19	54 8.9	+0.01	7 35.2	1.66	9.5
23	14 47.4	14 48.4	54 10.2	+0.20	54 13.7	0.38	8 15.4	1.70	10.5
24	14 50.0	14 52.0	54 19.3	0.54	54 26.8	0.69	8 57.1	1.78	11.5
25	14 54.4	14 57.3	54 35.9	0.82	54 46.5	0.93	9 41.2	1.90	12.5
26	15 0.6	15 4.1	54 58.4	1.03	55 11.3	1.11	10 28.5	2.04	13.5
27	15 7.8	15 11.7	55 25.1	1.17	55 39.5	1.21	11 19.2	2.17	14.5
28	15 15.7	15 19.8	55 54.1	1.23	56 9.0	1.25	12 12.9	2.27	15.5
29	15 23.9	15 28.0	56 24.0	1.25	56 38.9	1.24	13 8.5	2.32	16.5
30	15 32.0	15 35.9	56 53.7	1.22	57 8.2	1.20	14 4.4	2.30	17.5
31	15 39.8	15 43.6	57 22.4	+1.17	57 36.1	+1.13	14 59.1	2.23	18.5



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 1.					SATURDAY 3.				
0	h. m. s.	N.	O. I. U.	"	0	h. m. s.	N.	O. I. U.	"
0	4 32 1.06	2.3153	N.25 32 59.4	2.788	0	6 25 19.88	2.3737	N.25 3 10.5	4.305
1	4 34 20.09	2.3193	25 35 42.6	2.683	1	6 27 42.21	2.3717	24 58 59.9	4.340
2	4 36 39.30	2.3216	25 38 17.6	2.517	2	6 30 4.48	2.3707	24 54 40.6	4.304
3	4 38 58.69	2.3247	25 40 44.5	2.380	3	6 32 26.69	2.3697	24 50 12.6	4.268
4	4 41 18.26	2.3277	25 43 3.1	2.242	4	6 34 48.83	2.3685	24 45 36.0	4.091
5	4 43 38.01	2.3306	25 45 13.5	2.103	5	6 37 10.90	2.3673	24 40 50.7	4.026
6	4 45 57.93	2.3333	25 47 15.5	1.964	6	6 39 32.99	2.3660	24 35 56.8	4.970
7	4 48 18.01	2.3360	25 49 9.2	1.825	7	6 41 54.81	2.3647	24 30 54.3	5.113
8	4 50 38.25	2.3386	25 50 54.6	1.685	8	6 44 16.65	2.3633	24 25 43.3	5.265
9	4 52 58.64	2.3411	25 52 31.7	1.545	9	6 46 38.40	2.3618	24 20 23.8	5.397
10	4 55 19.18	2.3435	25 54 0.3	1.405	10	6 49 0.05	2.3602	24 14 55.8	5.536
11	4 57 39.86	2.3459	25 55 20.4	1.264	11	6 51 21.61	2.3585	24 9 19.3	5.678
12	5 0 0.69	2.3482	25 56 32.1	1.123	12	6 53 43.07	2.3569	24 3 34.4	5.818
13	5 2 21.66	2.3505	25 57 35.2	0.981	13	6 56 4.43	2.3552	23 57 41.1	5.966
14	5 4 42.77	2.3527	25 58 29.8	0.839	14	6 58 25.69	2.3535	23 51 39.4	6.098
15	5 7 4.01	2.3547	25 59 15.9	0.697	15	7 0 46.85	2.3517	23 45 29.3	6.297
16	5 9 25.37	2.3566	25 59 53.5	0.555	16	7 3 7.90	2.3498	23 39 10.9	6.375
17	5 11 46.84	2.3583	26 0 22.5	0.413	17	7 5 28.83	2.3478	23 32 44.3	6.513
18	5 14 8.41	2.3602	26 0 42.9	0.268	18	7 7 49.63	2.3467	23 26 9.4	6.650
19	5 16 30.08	2.3618	26 0 54.6	0.124	19	7 10 10.30	2.3446	23 19 26.3	6.787
20	5 18 51.85	2.3634	26 0 57.7	0.020	20	7 12 30.84	2.3414	23 12 35.0	6.923
21	5 21 13.71	2.3650	26 0 52.1	0.165	21	7 14 51.25	2.3392	23 5 35.6	7.098
22	5 23 35.68	2.3665	26 0 37.7	0.311	22	7 17 11.53	2.3370	22 58 28.1	7.198
23	5 25 57.69	2.3679	N.26 0 14.6	0.457	23	7 19 31.68	2.3348	N.22 51 12.5	7.298
FRIDAY 2.					SUNDAY 4.				
0	5 28 19.80	2.3692	N.25 59 42.8	0.602	0	7 21 51.70	2.3325	N.22 43 48.8	7.462
1	5 30 41.99	2.3704	25 59 2.3	0.747	1	7 24 11.58	2.3302	22 36 17.1	7.565
2	5 33 4.25	2.3715	25 58 13.1	0.892	2	7 26 31.32	2.3278	22 28 37.4	7.727
3	5 35 26.57	2.3725	25 57 15.2	1.038	3	7 28 50.92	2.3254	22 20 49.8	7.859
4	5 37 48.95	2.3734	25 56 8.6	1.184	4	7 31 10.37	2.3230	22 12 54.3	7.980
5	5 40 11.39	2.3742	25 54 53.2	1.330	5	7 33 29.67	2.3205	22 4 51.0	8.130
6	5 42 33.85	2.3748	25 53 29.0	1.477	6	7 35 48.92	2.3180	21 56 39.9	8.249
7	5 44 56.35	2.3753	25 51 56.0	1.624	7	7 38 7.82	2.3155	21 48 21.1	8.376
8	5 47 18.89	2.3758	25 50 14.1	1.771	8	7 40 26.67	2.3129	21 39 54.7	8.503
9	5 49 41.46	2.3762	25 48 23.4	1.918	9	7 42 45.37	2.3103	21 31 20.7	8.630
10	5 52 4.05	2.3766	25 46 23.9	2.065	10	7 45 3.91	2.3077	21 22 39.1	8.757
11	5 54 26.66	2.3769	25 44 15.6	2.212	11	7 47 22.29	2.3051	21 13 49.9	8.883
12	5 56 49.28	2.3771	25 41 58.5	2.358	12	7 49 40.52	2.3025	21 4 53.2	9.007
13	5 59 11.91	2.3772	25 39 32.6	2.505	13	7 51 58.59	2.2999	20 55 49.1	9.130
14	6 1 34.54	2.3772	25 36 57.9	2.652	14	7 54 16.50	2.2972	20 46 37.6	9.253
15	6 3 57.16	2.3771	25 34 14.4	2.798	15	7 56 34.25	2.2945	20 37 18.7	9.376
16	6 6 19.78	2.3769	25 31 22.1	2.944	16	7 58 51.84	2.2919	20 27 52.5	9.498
17	6 8 42.39	2.3766	25 28 21.1	3.090	17	8 1 9.26	2.2890	20 18 19.0	9.619
18	6 11 4.98	2.3763	25 25 11.4	3.235	18	8 3 26.51	2.2862	20 8 38.2	9.740
19	6 13 27.55	2.3759	25 21 53.0	3.380	19	8 5 43.59	2.2834	19 58 50.2	9.860
20	6 15 50.09	2.3754	25 18 25.9	3.525	20	8 8 0.51	2.2806	19 48 55.1	9.978
21	6 18 12.60	2.3748	25 14 59.1	3.670	21	8 10 17.26	2.2778	19 38 52.9	10.096
22	6 20 35.07	2.3742	25 11 5.6	3.815	22	8 12 33.84	2.2750	19 28 43.7	10.211
23	6 22 57.50	2.3735	25 7 12.4	3.960	23	8 14 50.25	2.2722	19 18 27.5	10.326
24	6 25 19.88	2.3727	N.25 3 10.5	4.105	24	8 17 6.49	2.2694	N.19 8 4.4	10.440



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 5.					WEDNESDAY 7.				
0	8 17 6.49	2.3684	N. 19 8 4.4	10.440	0	10 3 16.60	2.1689	N. 8 54 53.6	14.678
1	8 19 22.56	2.3685	18 57 34.7	10.553	1	10 5 26.71	2.1680	8 40 11.1	14.738
2	8 21 38.47	2.3686	18 46 58.3	10.664	2	10 7 36.77	2.1672	8 25 25.0	14.797
3	8 23 54.32	2.3612	18 36 15.3	10.775	3	10 9 46.77	2.1665	8 10 35.4	14.855
4	8 26 9.81	2.3685	18 25 25.4	10.885	4	10 11 56.72	2.1658	7 55 42.4	14.911
5	8 28 25.24	2.3686	18 14 29.0	10.995	5	10 14 6.63	2.1651	7 40 46.1	14.965
6	8 30 40.51	2.3682	18 3 26.0	11.105	6	10 16 16.51	2.1645	7 25 46.6	15.018
7	8 32 55.62	2.3685	17 52 16.5	11.213	7	10 18 26.35	2.1640	7 10 43.9	15.070
8	8 35 10.57	2.3478	17 41 0.5	11.320	8	10 20 36.17	2.1636	6 55 38.2	15.120
9	8 37 25.36	2.3461	17 29 36.1	11.427	9	10 22 45.96	2.1632	6 40 29.5	15.170
10	8 39 40.00	2.3425	17 18 9.4	11.532	10	10 24 55.73	2.1628	6 25 17.9	15.218
11	8 41 54.48	2.3290	17 6 34.4	11.635	11	10 27 5.48	2.1625	6 10 3.4	15.265
12	8 44 8.81	2.3278	16 54 53.2	11.737	12	10 29 15.21	2.1623	5 54 46.1	15.310
13	8 46 22.97	2.3247	16 43 5.9	11.838	13	10 31 24.94	2.1622	5 39 26.2	15.353
14	8 48 36.97	2.3231	16 31 12.6	11.938	14	10 33 34.67	2.1622	5 24 3.7	15.395
15	8 50 50.82	2.3226	16 19 13.4	12.037	15	10 35 44.39	2.1622	5 8 38.7	15.436
16	8 53 4.51	2.3229	16 7 8.3	12.135	16	10 37 54.12	2.1622	4 53 11.3	15.476
17	8 55 18.05	2.3244	15 54 57.3	12.232	17	10 40 3.86	2.1623	4 37 41.6	15.513
18	8 57 31.44	2.3220	15 42 40.5	12.328	18	10 42 13.61	2.1625	4 22 9.7	15.549
19	8 59 44.69	2.3195	15 30 18.0	12.423	19	10 44 23.38	2.1629	4 6 35.7	15.584
20	9 1 57.80	2.3173	15 17 49.8	12.517	20	10 46 33.17	2.1633	3 50 59.7	15.617
21	9 4 10.77	2.3160	15 5 16.0	12.610	21	10 48 42.99	2.1638	3 35 21.7	15.648
22	9 6 23.60	2.3127	14 52 36.7	12.702	22	10 50 52.84	2.1644	3 19 41.9	15.678
23	9 8 36.29	2.3104	N. 14 39 51.9	12.792	23	10 53 2.73	2.1651	N. 3 4 0.2	15.708
TUESDAY 6.					THURSDAY 8.				
0	9 10 48.84	2.3082	N. 14 27 1.7	12.882	0	10 55 12.66	2.1666	N. 2 48 16.8	15.737
1	9 13 1.26	2.3060	14 14 6.1	12.971	1	10 57 22.63	2.1665	2 32 31.8	15.764
2	9 15 13.55	2.3038	14 1 5.2	13.069	2	10 59 32.65	2.1673	2 16 45.2	15.789
3	9 17 25.71	2.3017	13 47 59.1	13.145	3	11 1 42.72	2.1683	2 0 57.1	15.813
4	9 19 37.74	2.1995	13 34 47.9	13.229	4	11 3 52.85	2.1693	1 45 7.6	15.835
5	9 21 49.65	2.1975	13 21 31.6	13.312	5	11 6 3.04	2.1708	1 29 16.8	15.856
6	9 24 1.44	2.1956	13 8 10.3	13.395	6	11 8 13.30	2.1715	1 13 24.8	15.875
7	9 26 13.11	2.1936	12 54 44.1	13.477	7	11 10 23.63	2.1728	0 57 31.7	15.892
8	9 28 24.67	2.1918	12 41 13.1	13.557	8	11 12 34.04	2.1742	0 41 37.6	15.908
9	9 30 36.12	2.1900	12 27 37.3	13.637	9	11 14 44.53	2.1757	0 25 42.6	15.922
10	9 32 47.46	2.1882	12 13 56.8	13.715	10	11 16 55.11	2.1772	N. 0 9 46.8	15.935
11	9 34 58.70	2.1864	12 0 11.6	13.792	11	11 19 5.79	2.1786	S. 0 6 9.7	15.947
12	9 37 9.83	2.1847	11 46 21.8	13.868	12	11 21 16.56	2.1804	0 22 6.9	15.957
13	9 39 20.86	2.1831	11 32 27.5	13.943	13	11 23 27.43	2.1820	0 38 4.6	15.966
14	9 41 31.80	2.1815	11 18 28.7	14.017	14	11 25 38.40	2.1837	0 54 2.7	15.971
15	9 43 42.65	2.1800	11 4 25.5	14.089	15	11 27 49.48	2.1855	1 10 1.1	15.975
16	9 45 53.41	2.1785	10 50 18.0	14.159	16	11 30 0.67	2.1875	1 25 59.7	15.978
17	9 48 4.08	2.1771	10 36 6.3	14.228	17	11 32 11.98	2.1895	1 41 58.5	15.979
18	9 50 14.86	2.1757	10 21 50.5	14.296	18	11 34 23.41	2.1916	1 57 57.3	15.980
19	9 52 25.16	2.1743	10 7 30.7	14.362	19	11 36 34.96	2.1937	2 13 56.2	15.979
20	9 54 35.58	2.1730	9 53 6.9	14.428	20	11 38 46.64	2.1959	2 29 55.0	15.976
21	9 56 45.93	2.1718	9 38 39.2	14.493	21	11 40 58.46	2.1982	2 45 53.0	15.971
22	9 58 56.22	2.1706	9 24 7.7	14.556	22	11 43 10.43	2.2007	3 1 51.8	15.964
23	10 1 6.44	2.1696	9 9 32.5	14.618	23	11 45 22.54	2.2032	3 17 49.5	15.956
24	10 3 16.60	2.1689	N. 8 54 53.6	14.678	24	11 47 34.80	2.2057	S. 3 33 46.6	15.946



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 9.					SUNDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	11 47 34.80	2.2067	S. 3 33 46.6	15.946	0	13 37 36.65	2.2098	S. 15 34 2.4	12.255
1	11 49 47.22	2.2083	3 49 43.0	15.984	1	13 40 0.76	2.4043	15 47 20.7	12.235
2	11 51 59.80	2.2109	4 5 38.6	15.921	2	13 42 25.17	2.4083	16 0 33.0	12.153
3	11 54 12.54	2.2136	4 21 33.4	15.906	3	13 44 49.88	2.4143	16 13 39.1	12.049
4	11 56 25.45	2.2164	4 37 27.3	15.890	4	13 47 14.88	2.4192	16 26 38.9	12.943
5	11 58 38.53	2.2193	4 53 20.2	15.872	5	13 49 40.18	2.4242	16 39 32.3	12.885
6	12 0 51.78	2.2222	5 9 11.9	15.852	6	13 52 5.78	2.4292	16 52 19.2	12.777
7	12 3 5.20	2.2252	5 25 2.4	15.830	7	13 54 31.68	2.4342	17 4 59.6	12.617
8	12 5 18.80	2.2284	5 40 51.6	15.807	8	13 56 57.88	2.4392	17 17 33.3	12.504
9	12 7 32.60	2.2316	5 56 39.3	15.783	9	13 59 24.38	2.4442	17 30 0.1	12.389
10	12 9 46.59	2.2349	6 12 25.4	15.758	10	14 1 51.18	2.4492	17 42 19.9	12.278
11	12 12 0.78	2.2382	6 28 9.8	15.732	11	14 4 18.29	2.4542	17 54 32.8	12.164
12	12 14 15.17	2.2415	6 43 52.4	15.698	12	14 6 45.70	2.4592	18 6 38.5	12.085
13	12 16 29.76	2.2449	6 59 33.0	15.660	13	14 9 13.41	2.4642	18 18 37.0	11.914
14	12 18 44.56	2.2484	7 15 11.6	15.626	14	14 11 41.41	2.4692	18 30 28.2	11.792
15	12 20 59.57	2.2520	7 30 48.1	15.590	15	14 14 9.70	2.4740	18 42 11.9	11.665
16	12 23 14.80	2.2557	7 46 22.4	15.552	16	14 16 38.28	2.4788	18 53 48.0	11.537
17	12 25 30.25	2.2595	8 1 54.4	15.513	17	14 19 7.15	2.4837	19 5 16.4	11.408
18	12 27 45.93	2.2634	8 17 24.0	15.473	18	14 21 36.31	2.4885	19 16 37.0	11.278
19	12 30 1.84	2.2673	8 32 51.1	15.430	19	14 24 5.76	2.4933	19 27 49.8	11.146
20	12 32 17.99	2.2712	8 48 15.6	15.386	20	14 26 35.50	2.4980	19 38 54.8	11.016
21	12 34 34.38	2.2752	9 3 37.3	15.338	21	14 29 5.52	2.5027	19 49 51.8	10.880
22	12 36 51.01	2.2792	9 18 56.0	15.288	22	14 31 35.82	2.5073	20 0 40.5	10.742
23	12 39 7.88	2.2832	S. 9 34 11.7	15.236	23	14 34 6.40	2.5120	S. 20 11 20.9	10.605
SATURDAY 10.					MONDAY 12.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	12 41 24.99	2.2872	S. 9 49 24.3	15.183	0	14 36 37.26	2.5166	S. 20 21 53.1	10.466
1	12 43 42.35	2.2913	10 4 33.7	15.129	1	14 39 8.39	2.5211	20 32 16.9	10.326
2	12 45 59.96	2.2953	10 19 39.8	15.073	2	14 41 39.70	2.5256	20 42 32.2	10.183
3	12 48 17.83	2.2999	10 34 42.5	15.016	3	14 44 11.45	2.5300	20 52 38.8	10.088
4	12 50 35.96	2.3043	10 49 41.6	14.955	4	14 46 43.37	2.5340	21 2 36.7	9.992
5	12 52 54.35	2.3087	11 4 37.0	14.892	5	14 49 15.53	2.5381	21 12 25.8	9.744
6	12 55 13.00	2.3131	11 19 28.6	14.828	6	14 51 47.95	2.5423	21 22 6.0	9.595
7	12 57 31.92	2.3175	11 34 16.3	14.762	7	14 54 20.60	2.5463	21 31 37.2	9.444
8	12 59 51.10	2.3220	11 49 0.0	14.694	8	14 56 53.49	2.5502	21 40 59.3	9.292
9	13 2 10.55	2.3265	12 3 39.6	14.624	9	14 59 26.62	2.5541	21 50 12.2	9.139
10	13 4 30.28	2.3312	12 18 15.0	14.553	10	15 1 59.98	2.5579	21 59 15.9	8.985
11	13 6 50.29	2.3358	12 32 40.1	14.480	11	15 4 33.56	2.5616	22 8 10.3	8.830
12	13 9 10.58	2.3405	12 47 12.7	14.406	12	15 7 7.35	2.5652	22 16 55.4	8.674
13	13 11 31.15	2.3452	13 1 34.7	14.329	13	15 9 41.38	2.5688	22 25 31.2	8.517
14	13 13 52.00	2.3499	13 15 52.0	14.248	14	15 12 15.63	2.5724	22 33 57.5	8.356
15	13 16 13.13	2.3547	13 30 4.5	14.167	15	15 14 50.09	2.5759	22 42 14.2	8.198
16	13 18 34.56	2.3595	13 44 12.1	14.085	16	15 17 24.75	2.5792	22 50 21.2	8.037
17	13 20 56.28	2.3645	13 58 14.7	14.001	17	15 19 59.60	2.5825	22 58 18.5	7.874
18	13 23 18.29	2.3694	14 12 12.2	13.916	18	15 22 34.63	2.5858	23 6 6.0	7.709
19	13 25 40.60	2.3743	14 26 4.4	13.826	19	15 25 9.83	2.5892	23 13 43.6	7.542
20	13 28 3.21	2.3792	14 39 51.2	13.735	20	15 27 45.20	2.5910	23 21 11.2	7.377
21	13 30 26.12	2.3843	14 53 32.5	13.642	21	15 30 20.74	2.5937	23 28 28.8	7.210
22	13 32 49.33	2.3893	15 7 8.2	13.548	22	15 32 56.44	2.5963	23 35 36.4	7.043
23	13 35 12.84	2.3943	15 20 38.2	13.452	23	15 35 32.30	2.5989	23 42 34.0	6.876
24	13 37 36.65	2.3993	S. 15 34 2.4	13.355	24	15 38 8.31	2.6013	S. 23 49 21.6	6.708



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 13.					THURSDAY 15.				
0	15 38 8.31	2.6018	S. 23 49 21.6	6.708	0	17 43 3.36	2.5475	S. 25 49 17.0	1.668
1	15 40 44.46	2.6036	23 55 59.0	6.536	1	17 45 36.07	2.5436	25 47 32.0	1.833
2	15 43 20.75	2.6066	24 2 26.3	6.367	2	17 48 8.49	2.5390	25 45 37.2	1.995
3	15 45 57.16	2.6078	24 8 43.1	6.196	3	17 50 40.62	2.5333	25 43 32.6	2.167
4	15 48 33.68	2.6096	24 14 49.6	6.023	4	17 53 12.46	2.5282	25 41 18.3	2.318
5	15 51 10.31	2.6113	24 20 45.7	5.848	5	17 55 44.00	2.5231	25 38 54.4	2.478
6	15 53 47.03	2.6136	24 26 31.4	5.674	6	17 58 15.23	2.5180	25 36 21.0	2.637
7	15 56 23.84	2.6143	24 32 6.7	5.500	7	18 0 46.15	2.5128	25 33 38.1	2.795
8	15 59 0.73	2.6156	24 37 31.5	5.326	8	18 3 16.76	2.5075	25 30 45.7	2.962
9	16 1 37.69	2.6166	24 42 45.8	5.153	9	18 5 47.05	2.5021	25 27 43.9	3.108
10	16 4 14.72	2.6177	24 47 49.6	4.973	10	18 8 17.01	2.4967	25 24 32.7	3.263
11	16 6 51.81	2.6196	24 52 42.9	4.801	11	18 10 46.64	2.4912	25 21 12.2	3.417
12	16 9 28.95	2.6198	24 57 25.6	4.624	12	18 13 15.94	2.4855	25 17 42.5	3.570
13	16 12 6.13	2.6199	25 1 57.7	4.447	13	18 15 44.88	2.4797	25 14 3.7	3.721
14	16 14 43.34	2.6204	25 6 19.2	4.270	14	18 18 13.46	2.4737	25 10 15.9	3.871
15	16 17 20.57	2.6207	25 10 30.1	4.093	15	18 20 41.68	2.4676	25 6 19.2	4.019
16	16 19 57.82	2.6209	25 14 30.3	3.916	16	18 23 9.53	2.4614	25 2 13.7	4.165
17	16 22 35.06	2.6209	25 18 19.7	3.737	17	18 25 37.01	2.4552	24 57 59.4	4.310
18	16 25 12.33	2.6208	25 21 58.4	3.566	18	18 28 4.12	2.4490	24 53 36.4	4.454
19	16 27 49.57	2.6206	25 25 26.4	3.379	19	18 30 30.85	2.4427	24 49 4.8	4.596
20	16 30 26.79	2.6201	25 28 43.7	3.200	20	18 32 57.20	2.4363	24 44 24.6	4.741
21	16 33 3.98	2.6196	25 31 50.3	3.023	21	18 35 23.17	2.4299	24 39 35.9	4.883
22	16 35 41.13	2.6188	25 34 46.2	2.843	22	18 37 48.75	2.4234	24 34 38.8	5.023
23	16 38 18.24	2.6179	S. 25 37 31.4	2.665	23	18 40 13.94	2.4168	S. 24 29 33.3	5.162
WEDNESDAY 14.					FRIDAY 16.				
0	16 40 55.29	2.6168	S. 25 40 6.1	2.486	0	18 42 38.73	2.4101	S. 24 24 19.5	5.299
1	16 43 32.27	2.6156	25 42 29.9	2.308	1	18 45 3.13	2.4034	24 18 57.5	5.454
2	16 46 9.17	2.6142	25 44 43.0	2.130	2	18 47 27.13	2.3966	24 13 27.4	5.606
3	16 48 45.98	2.6127	25 46 45.4	1.962	3	18 49 50.72	2.3898	24 7 49.3	5.761
4	16 51 22.69	2.6111	25 48 37.2	1.775	4	18 52 13.90	2.3829	24 2 3.3	5.892
5	16 53 59.30	2.6096	25 50 18.4	1.598	5	18 54 36.67	2.3760	23 56 9.5	5.961
6	16 56 35.80	2.6074	25 51 49.0	1.421	6	18 56 59.02	2.3690	23 50 8.0	6.089
7	16 59 12.18	2.6063	25 53 9.0	1.244	7	18 59 20.95	2.3620	23 43 58.9	6.215
8	17 1 48.43	2.6080	25 54 18.4	1.068	8	19 1 42.46	2.3550	23 37 42.3	6.340
9	17 4 24.53	2.6006	25 55 17.3	0.893	9	19 4 3.55	2.3480	23 31 18.1	6.464
10	17 7 0.48	2.5979	25 56 5.7	0.719	10	19 6 24.22	2.3410	23 24 46.5	6.587
11	17 9 36.27	2.5961	25 56 43.6	0.545	11	19 8 44.47	2.3340	23 18 7.6	6.709
12	17 12 11.89	2.5923	25 57 11.1	0.371	12	19 11 4.30	2.3270	23 11 21.4	6.830
13	17 14 47.33	2.5892	25 57 28.1	0.197	13	19 13 23.71	2.3199	23 4 28.0	6.949
14	17 17 22.59	2.5861	25 57 34.7	0.023	14	19 15 42.69	2.3128	22 57 27.5	7.067
15	17 19 57.66	2.5826	25 57 30.9	0.180	15	19 18 1.24	2.3057	22 50 20.0	7.183
16	17 22 32.52	2.5794	25 57 16.8	0.323	16	19 20 19.36	2.2985	22 43 5.6	7.297
17	17 25 7.18	2.5760	25 56 52.4	0.468	17	19 22 37.05	2.2913	22 35 44.4	7.409
18	17 27 41.63	2.5734	25 56 17.7	0.668	18	19 24 54.31	2.2842	22 28 16.5	7.521
19	17 30 15.86	2.5696	25 55 32.8	0.833	19	19 27 11.14	2.2770	22 20 41.9	7.632
20	17 32 49.86	2.5647	25 54 37.7	1.002	20	19 29 27.54	2.2698	22 13 0.7	7.741
21	17 35 23.62	2.5606	25 53 32.5	1.170	21	19 31 43.51	2.2627	22 5 13.0	7.849
22	17 37 57.13	2.5564	25 52 17.3	1.337	22	19 33 59.05	2.2555	21 57 18.9	7.955
23	17 40 30.38	2.5520	25 50 52.1	1.503	23	19 36 14.16	2.2483	21 49 18.5	8.068
24	17 43 3.66	2.5475	S. 25 49 17.0	1.668	24	19 38 28.85	2.2412	S. 21 41 11.9	8.162



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 17.					MONDAY 19.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	19 38 28.85	2.2412	S. 21 41 11.9	8.162	1	21 18 23.32	1.9401	S. 13 35 14.5	11.681
2	19 40 43.11	2.2240	21 32 59.2	8.362	2	21 20 19.68	1.9381	13 23 35.3	11.677
3	19 42 56.94	2.2268	21 24 40.5	8.362	3	21 22 15.55	1.9362	13 11 53.4	11.732
4	19 45 10.34	2.2197	21 16 15.8	8.462	4	21 24 11.23	1.9284	13 0 8.8	11.765
5	19 47 23.31	2.2127	21 7 45.2	8.560	5	21 26 6.62	1.9207	12 48 21.6	11.807
6	19 49 35.86	2.2066	20 59 8.7	8.657	6	21 28 1.73	1.9160	12 36 31.9	11.849
7	19 51 47.98	2.1985	20 50 26.4	8.753	7	21 29 56.66	1.9114	12 24 39.7	11.890
8	19 53 59.68	2.1914	20 41 38.4	8.847	8	21 31 51.12	1.9068	12 12 45.1	11.930
9	19 56 10.95	2.1843	20 32 44.9	8.938	9	21 33 45.41	1.9026	12 0 48.2	11.969
10	19 58 21.80	2.1773	20 23 45.9	9.028	10	21 35 39.43	1.8983	11 48 49.0	12.007
11	20 0 32.23	2.1703	20 14 41.5	9.118	11	21 37 33.20	1.8940	11 36 47.5	12.044
12	20 2 42.24	2.1633	20 5 31.7	9.207	12	21 39 26.72	1.8898	11 24 43.8	12.080
13	20 4 51.82	2.1564	19 56 16.0	9.293	13	21 41 19.99	1.8857	11 12 37.0	12.115
14	20 7 1.00	2.1495	19 46 50.3	9.381	14	21 43 13.01	1.8817	11 0 29.9	12.149
15	20 9 9.77	2.1427	19 37 30.9	9.466	15	21 45 5.79	1.8777	10 48 19.9	12.183
16	20 11 18.13	2.1360	19 28 0.5	9.547	16	21 46 58.33	1.8737	10 36 7.9	12.216
17	20 13 26.09	2.1293	19 18 25.2	9.626	17	21 48 50.64	1.8696	10 23 53.9	12.248
18	20 15 33.05	2.1227	19 8 45.1	9.708	18	21 50 42.72	1.8652	10 11 38.0	12.279
19	20 17 40.81	2.1160	18 59 0.2	9.787	19	21 52 34.59	1.8608	9 59 20.3	12.310
20	20 19 47.57	2.1093	18 49 10.6	9.865	20	21 54 26.24	1.8560	9 47 0.8	12.340
21	20 21 53.93	2.1027	18 39 16.4	9.942	21	21 56 17.67	1.8516	9 34 39.5	12.369
22	20 23 59.90	2.0962	18 29 17.6	10.018	22	21 58 8.89	1.8471	9 23 16.5	12.397
23	20 26 5.48	2.0897	18 19 14.3	10.092	23	21 59 59.91	1.8427	9 9 51.8	12.425
24	20 28 10.67	2.0832	S. 18 9 6.6	10.166	24	22 1 50.73	1.8383	S. 8 57 25.5	12.453
SUNDAY 18.					TUESDAY 20.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	20 30 15.48	2.0768	S. 17 58 54.6	10.237	1	22 3 41.35	1.8430	S. 8 44 57.6	12.478
2	20 32 19.90	2.0706	17 48 38.3	10.308	2	22 5 31.78	1.8386	8 32 28.2	12.502
3	20 34 23.94	2.0642	17 38 17.7	10.378	3	22 7 22.02	1.8343	8 19 57.4	12.526
4	20 36 27.60	2.0579	17 27 52.9	10.447	4	22 9 12.08	1.8300	8 7 25.2	12.549
5	20 38 30.89	2.0517	17 17 24.0	10.515	5	22 11 1.96	1.8258	7 54 51.6	12.572
6	20 40 33.81	2.0455	17 6 51.1	10.582	6	22 12 51.06	1.8216	7 42 16.6	12.595
7	20 42 36.36	2.0394	16 56 14.3	10.647	7	22 14 41.18	1.8173	7 29 40.3	12.617
8	20 44 38.54	2.0333	16 45 33.6	10.710	8	22 16 30.53	1.8131	7 17 2.7	12.639
9	20 46 40.36	2.0272	16 34 49.1	10.772	9	22 18 19.72	1.8184	7 4 23.8	12.660
10	20 48 41.81	2.0212	16 24 0.9	10.833	10	22 20 8.75	1.8142	6 51 43.6	12.680
11	20 50 42.90	2.0153	16 13 9.1	10.893	11	22 21 57.62	1.8100	6 39 2.2	12.699
12	20 52 43.65	2.0095	16 2 13.7	10.953	12	22 23 46.34	1.8108	6 26 19.7	12.717
13	20 54 44.05	2.0036	15 51 14.8	11.013	13	22 25 34.92	1.8066	6 13 36.2	12.734
14	20 56 44.11	1.9981	15 40 12.4	11.069	14	22 27 23.36	1.8022	6 0 51.7	12.750
15	20 58 43.83	1.9925	15 29 6.6	11.125	15	22 29 11.67	1.8040	5 48 6.3	12.765
16	21 0 43.22	1.9870	15 17 57.4	11.180	16	22 30 59.85	1.8019	5 35 20.0	12.780
17	21 2 42.28	1.9816	15 6 44.9	11.234	17	22 32 47.90	1.7998	5 22 32.8	12.794
18	21 4 41.02	1.9763	14 55 29.2	11.288	18	22 34 35.83	1.7976	5 9 44.7	12.808
19	21 6 39.44	1.9710	14 44 10.3	11.340	19	22 36 23.64	1.7955	4 56 55.8	12.821
20	21 8 37.52	1.9657	14 32 48.3	11.391	20	22 38 11.34	1.7934	4 44 6.2	12.833
21	21 10 35.29	1.9604	14 21 23.4	11.441	21	22 39 58.93	1.7913	4 31 15.9	12.844
22	21 12 32.75	1.9552	14 9 55.5	11.490	22	22 41 46.42	1.7892	4 18 24.9	12.856
23	21 14 29.91	1.9501	13 58 24.7	11.538	23	22 43 33.81	1.7870	4 5 33.3	12.868
24	21 16 26.77	1.9451	13 46 51.0	11.585	24	22 45 21.11	1.7849	3 52 41.1	12.879
	21 18 23.32	1.9401	S. 13 35 14.5	11.631		22 47 8.32	1.7828	S. 3 39 48.3	12.891



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 21.					FRIDAY 23.				
0	22 47 8.32	1.7861	S. 3 39 48.3	12.884	0	0 12 30.82	1.7984	N. 6 37 20.2	12.585
1	22 48 55.44	1.7847	3 26 55.0	12.893	1	0 14 18.78	1.8008	6 49 54.7	12.563
2	22 50 42.48	1.7833	3 14 1.2	12.902	2	0 16 6.86	1.8028	7 2 27.8	12.540
3	22 52 29.44	1.7820	3 1 6.9	12.910	3	0 17 55.06	1.8044	7 14 59.5	12.517
4	22 54 16.32	1.7808	2 48 12.1	12.917	4	0 19 43.39	1.8066	7 27 29.8	12.493
5	22 56 3.13	1.7796	2 35 16.9	12.923	5	0 21 31.85	1.8087	7 39 58.7	12.468
6	22 57 49.87	1.7786	2 22 21.3	12.928	6	0 23 20.44	1.8110	7 52 26.1	12.443
7	22 59 36.55	1.7776	2 9 25.4	12.933	7	0 25 9.17	1.8134	8 4 51.9	12.417
8	23 1 23.17	1.7768	1 56 29.3	12.937	8	0 26 58.04	1.8168	8 17 16.1	12.389
9	23 3 9.74	1.7766	1 43 33.0	12.940	9	0 28 47.06	1.8189	8 29 38.6	12.360
10	23 4 56.26	1.7760	1 30 36.5	12.943	10	0 30 36.24	1.8209	8 41 59.3	12.331
11	23 6 42.74	1.7748	1 17 39.9	12.945	11	0 32 25.57	1.8235	8 54 18.3	12.302
12	23 8 29.18	1.7737	1 4 43.2	12.947	12	0 34 15.06	1.8262	9 6 35.5	12.272
13	23 10 15.59	1.7732	0 51 46.4	12.948	13	0 36 4.71	1.8289	9 18 50.9	12.243
14	23 12 1.97	1.7728	0 38 49.5	12.948	14	0 37 54.53	1.8317	9 31 4.4	12.211
15	23 13 48.33	1.7726	0 25 52.6	12.948	15	0 39 44.52	1.8346	9 43 16.1	12.180
16	23 15 34.67	1.7721	S. 0 12 55.7	12.948	16	0 41 34.67	1.8374	9 55 25.9	12.147
17	23 17 20.99	1.7718	N. 0 0 1.1	12.947	17	0 43 25.00	1.8403	10 7 33.7	12.118
18	23 19 7.29	1.7716	0 12 57.8	12.945	18	0 45 15.51	1.8433	10 19 39.4	12.078
19	23 20 53.57	1.7712	0 25 54.4	12.943	19	0 47 6.20	1.8464	10 31 43.0	12.043
20	23 22 39.84	1.7712	0 38 50.8	12.938	20	0 48 57.08	1.8496	10 43 44.5	12.007
21	23 24 26.11	1.7712	0 51 46.9	12.933	21	0 50 48.15	1.8527	10 55 43.8	11.970
22	23 26 12.39	1.7714	1 4 42.7	12.928	22	0 52 39.41	1.8560	11 7 40.9	11.932
23	23 27 58.68	1.7717	N. 1 17 38.2	12.922	23	0 54 30.87	1.8593	N. 11 19 35.7	11.894
THURSDAY 22.					SATURDAY 24.				
0	23 29 44.99	1.7720	N. 1 30 33.3	12.916	0	0 56 22.53	1.8627	N. 11 31 28.2	11.855
1	23 31 31.32	1.7728	1 43 28.0	12.910	1	0 58 14.40	1.8662	11 43 18.3	11.815
2	23 33 17.67	1.7736	1 56 23.4	12.903	2	1 0 6.48	1.8697	11 55 5.9	11.774
3	23 35 4.04	1.7730	2 9 16.4	12.896	3	1 1 58.77	1.8733	12 6 51.1	11.732
4	23 36 50.44	1.7726	2 22 9.9	12.888	4	1 3 51.28	1.8770	12 18 33.8	11.690
5	23 38 36.87	1.7741	2 35 2.9	12.879	5	1 5 44.01	1.8807	12 30 13.9	11.647
6	23 40 23.34	1.7748	2 47 55.4	12.870	6	1 7 36.97	1.8845	12 41 51.4	11.603
7	23 42 9.85	1.7755	3 0 47.3	12.860	7	1 9 30.16	1.8883	12 53 26.2	11.557
8	23 43 56.40	1.7762	3 13 38.6	12.849	8	1 11 23.58	1.8921	13 4 58.2	11.511
9	23 45 43.00	1.7770	3 26 29.2	12.837	9	1 13 17.22	1.8959	13 16 27.4	11.464
10	23 47 29.65	1.7779	3 39 19.0	12.825	10	1 15 11.09	1.8998	13 27 53.8	11.416
11	23 49 16.36	1.7789	3 52 8.1	12.812	11	1 17 5.20	1.9038	13 39 17.3	11.367
12	23 51 3.13	1.7800	4 4 56.4	12.798	12	1 18 59.55	1.9079	13 50 37.8	11.317
13	23 52 49.97	1.7812	4 17 43.8	12.783	13	1 20 54.15	1.9120	14 1 55.2	11.266
14	23 54 36.88	1.7826	4 30 30.3	12.768	14	1 22 49.00	1.9162	14 13 9.6	11.215
15	23 56 23.87	1.7838	4 43 15.9	12.753	15	1 24 44.10	1.9206	14 24 20.0	11.163
16	23 58 10.94	1.7851	4 56 0.6	12.738	16	1 26 39.46	1.9248	14 35 29.1	11.111
17	23 59 58.09	1.7866	5 8 44.4	12.722	17	1 28 35.08	1.9292	14 46 34.2	11.058
18	0 1 45.33	1.7880	5 21 27.2	12.706	18	1 30 30.96	1.9336	14 57 36.1	11.006
19	0 3 32.66	1.7896	5 34 8.9	12.687	19	1 32 27.10	1.9378	15 8 34.7	10.950
20	0 5 20.08	1.7912	5 46 49.5	12.668	20	1 34 23.50	1.9423	15 19 30.0	10.894
21	0 7 7.60	1.7929	5 59 29.0	12.648	21	1 36 20.17	1.9467	15 30 21.9	10.836
22	0 8 55.23	1.7947	6 12 7.3	12.628	22	1 38 17.11	1.9513	15 41 10.3	10.777
23	0 10 42.97	1.7966	6 24 44.4	12.607	23	1 40 14.32	1.9560	15 51 55.2	10.717
24	0 12 30.82	1.7984	N. 6 37 20.2	12.585	24	1 42 11.81	1.9606	N. 16 2 36.5	10.657



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 25.					TUESDAY 27.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	1 42 11.81	1.9606	N.16 2 36.5	10.667	0	3 22 12.61	2.3115	N.23 5 18.8	6.562
1	1 44 9.59	1.9633	16 13 14.1	10.665	1	3 24 25.46	2.3166	23 11 48.6	6.540
2	1 46 7.65	1.9700	16 23 47.9	10.582	2	3 26 38.62	2.3220	23 18 11.6	6.287
3	1 48 5.99	1.9747	16 34 17.9	10.469	3	3 28 52.09	2.3272	23 24 27.8	6.213
4	1 50 4.61	1.9795	16 44 44.1	10.405	4	3 31 5.87	2.3323	23 30 37.2	6.098
5	1 52 3.52	1.9844	16 55 6.5	10.340	5	3 33 19.96	2.3374	23 36 39.7	5.983
6	1 54 2.72	1.9893	17 5 24.9	10.274	6	3 35 34.36	2.3425	23 42 35.3	5.867
7	1 56 2.22	1.9942	17 15 39.3	10.207	7	3 37 49.06	2.3476	23 48 23.9	5.750
8	1 58 2.02	1.9992	17 25 49.6	10.138	8	3 40 4.06	2.3525	23 54 5.4	5.632
9	2 0 2.12	2.0042	17 35 55.8	10.068	9	3 42 19.36	2.3575	23 59 39.8	5.513
10	2 2 2.52	2.0092	17 45 57.8	9.998	10	3 44 34.96	2.3624	24 5 6.9	5.393
11	2 4 3.22	2.0143	17 55 55.6	9.927	11	3 46 50.85	2.3673	24 10 26.8	5.271
12	2 6 4.23	2.0193	18 5 49.1	9.856	12	3 49 7.03	2.3721	24 15 39.4	5.148
13	2 8 5.54	2.0244	18 15 38.2	9.782	13	3 51 23.50	2.3768	24 20 44.6	5.025
14	2 10 7.16	2.0295	18 25 22.8	9.708	14	3 53 40.25	2.3816	24 25 42.4	4.901
15	2 12 9.09	2.0346	18 35 2.9	9.633	15	3 55 57.28	2.3861	24 30 32.7	4.776
16	2 14 11.32	2.0398	18 44 38.5	9.557	16	3 58 14.58	2.3907	24 35 15.4	4.648
17	2 16 13.86	2.0450	18 54 9.6	9.480	17	4 0 32.15	2.3952	24 39 50.4	4.520
18	2 18 16.72	2.0503	19 3 36.0	9.402	18	4 2 49.99	2.3996	24 44 17.7	4.391
19	2 20 19.90	2.0557	19 12 57.7	9.322	19	4 5 8.09	2.4039	24 48 37.3	4.262
20	2 22 23.40	2.0610	19 22 14.6	9.242	20	4 7 26.45	2.4082	24 52 49.1	4.132
21	2 24 27.22	2.0663	19 31 26.6	9.160	21	4 9 45.06	2.4124	24 56 53.1	4.002
22	2 26 31.36	2.0717	19 40 33.7	9.077	22	4 12 3.92	2.4166	25 0 49.2	3.870
23	2 28 35.82	2.0770	N.19 49 35.8	8.994	23	4 14 23.03	2.4207	N.25 4 37.4	3.737
MONDAY 26.					WEDNESDAY 28.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	2 30 40.60	2.0824	N.19 58 32.9	8.910	0	4 16 42.39	2.4247	N.25 8 17.6	3.603
1	2 32 45.71	2.0878	20 7 24.8	8.825	1	4 19 1.99	2.4287	25 11 49.8	3.469
2	2 34 51.14	2.0932	20 16 11.5	8.738	2	4 21 21.83	2.4327	25 15 13.9	3.333
3	2 36 56.89	2.0985	20 24 53.0	8.650	3	4 23 41.90	2.4366	25 18 29.8	3.197
4	2 39 2.96	2.1038	20 33 29.2	8.561	4	4 26 2.90	2.4402	25 21 37.6	3.061
5	2 41 9.35	2.1092	20 42 0.0	8.471	5	4 28 22.72	2.4438	25 24 37.2	2.925
6	2 43 16.06	2.1146	20 50 25.4	8.379	6	4 30 43.46	2.4474	25 27 28.6	2.788
7	2 45 23.10	2.1200	20 58 45.3	8.285	7	4 33 4.41	2.4509	25 30 11.7	2.650
8	2 47 30.47	2.1255	21 6 59.6	8.192	8	4 35 25.57	2.4543	25 32 46.5	2.511
9	2 49 38.17	2.1310	21 15 8.3	8.097	9	4 37 46.93	2.4577	25 35 13.0	2.372
10	2 51 46.20	2.1365	21 23 11.3	8.001	10	4 40 8.49	2.4610	25 37 31.1	2.232
11	2 53 54.56	2.1420	21 31 8.5	7.904	11	4 42 30.24	2.4642	25 39 40.8	2.091
12	2 56 3.24	2.1474	21 38 59.9	7.807	12	4 44 52.18	2.4672	25 41 42.0	1.950
13	2 58 12.25	2.1528	21 46 45.4	7.708	13	4 47 14.30	2.4701	25 43 34.6	1.808
14	3 0 21.59	2.1582	21 54 24.9	7.608	14	4 49 36.59	2.4728	25 45 18.6	1.665
15	3 2 31.25	2.1637	22 1 58.3	7.507	15	4 51 59.04	2.4755	25 46 54.0	1.522
16	3 4 41.24	2.1691	22 9 25.7	7.405	16	4 54 21.65	2.4782	25 48 20.8	1.378
17	3 6 51.55	2.1745	22 16 47.0	7.302	17	4 56 44.42	2.4808	25 49 38.9	1.233
18	3 9 2.18	2.1799	22 24 2.1	7.200	18	4 59 7.35	2.4834	25 50 48.3	1.087
19	3 11 13.13	2.1852	22 31 10.9	7.095	19	5 1 30.43	2.4858	25 51 48.9	0.940
20	3 13 24.40	2.1906	22 38 13.4	6.989	20	5 3 53.65	2.4881	25 52 40.7	0.792
21	3 15 35.98	2.1957	22 45 9.5	6.882	21	5 6 17.00	2.4902	25 53 23.7	0.647
22	3 17 47.87	2.2009	22 51 59.2	6.773	22	5 8 40.48	2.4923	25 53 57.9	0.500
23	3 20 0.06	2.2062	22 58 42.3	6.663	23	5 11 4.08	2.4943	25 54 23.3	0.352
24	3 22 12.61	2.2115	N.23 5 18.8	6.552	24	5 13 27.80	2.4963	N.25 54 39.9	0.202



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 29.					FRIDAY 30.				
0	5 13 27.80	2.3083	N.25 54 39.9	0.303	0	6 11 15.19	2.4033	N.25 16 28.2	3.391
1	5 15 51.63	2.3080	25 54 47.6	0.055	1	6 13 39.73	2.4036	25 13 0.3	3.540
2	5 18 15.56	2.3077	25 54 46.4	0.083	2	6 16 4.23	2.4079	25 9 23.5	3.689
3	5 20 39.59	2.4013	25 54 36.3	0.343	3	6 18 28.67	2.4070	25 5 37.7	3.838
4	5 23 3.71	2.4037	25 54 17.3	0.391	4	6 20 53.06	2.4080	25 1 43.0	3.987
5	5 25 27.91	2.4040	25 53 49.4	0.540	5	6 23 17.39	2.4049	24 57 39.4	4.135
6	5 27 52.18	2.4062	25 53 12.5	0.680	6	6 25 41.65	2.4037	24 53 26.9	4.282
7	5 30 16.53	2.4063	25 52 26.6	0.840	7	6 28 5.84	2.4026	24 49 5.6	4.429
8	5 32 40.94	2.4073	25 51 31.7	0.990	8	6 30 29.95	2.4012	24 44 35.5	4.576
9	5 35 5.41	2.4082	25 50 27.8	1.040	9	6 32 53.98	2.3998	24 39 56.6	4.722
10	5 37 29.93	2.4080	25 49 14.9	1.280	10	6 35 17.92	2.3982	24 35 8.9	4.868
11	5 39 54.49	2.4097	25 47 53.0	1.440	11	6 37 41.76	2.3968	24 30 12.5	5.012
12	5 42 19.09	2.4103	25 46 22.1	1.590	12	6 40 5.50	2.3948	24 25 7.4	5.156
13	5 44 43.79	2.4106	25 44 42.2	1.740	13	6 42 29.13	2.3930	24 19 53.6	5.303
14	5 47 8.38	2.4113	25 42 53.2	1.891	14	6 44 52.65	2.3910	24 14 31.1	5.447
15	5 49 33.07	2.4117	25 40 55.2	2.042	15	6 47 16.05	2.3890	24 9 0.0	5.590
16	5 51 57.78	2.4119	25 38 48.2	2.192	16	6 49 39.33	2.3870	24 3 20.3	5.733
17	5 54 22.50	2.4120	25 36 32.2	2.342	17	6 52 2.48	2.3849	23 57 32.0	5.876
18	5 56 47.22	2.4120	25 34 7.2	2.492	18	6 54 25.50	2.3827	23 51 35.2	6.018
19	5 59 11.94	2.4119	25 32 33.2	2.642	19	6 56 48.39	2.3804	23 45 29.9	6.156
20	6 1 36.65	2.4117	25 29 50.0	2.792	20	6 59 11.14	2.3780	23 39 16.2	6.296
21	6 4 1.34	2.4113	25 26 58.0	2.942	21	7 1 33.75	2.3756	23 32 54.1	6.438
22	6 6 25.99	2.4107	25 23 57.0	3.092	22	7 3 56.20	2.3731	23 26 23.6	6.577
23	6 8 50.61	2.4100	25 20 47.1	3.242	23	7 6 18.50	2.3706	23 19 44.7	6.715
24	6 11 15.19	2.4093	N.25 16 28.2	3.391	24	7 8 40.65	2.3678	N.23 12 57.6	6.853

## PHASES OF THE MOON.

	Day.	h.	m.
☾ Last Quarter, . . . . .	5	21	17.5
● New Moon, . . . . .	12	12	36.4
☽ First Quarter, . . . . .	19	20	52.7
○ Full Moon, . . . . .	27	23	37.9

	Day.	h.
☾ Perigee, . . . . .	10	15.0
☾ Apogee, . . . . .	22	11.4



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of DM.	IIIh.	P. L. of DM.	VIh.	P. L. of DM.	IXh.	P. L. of DM.
1	$\alpha$ Pegasi W.	78 6 45	2902	79 37 45	2902	81 8 58	2943	82 40 23	2933
	$\alpha$ Arietis W.	34 48 17	2950	36 21 40	2938	37 55 18	2927	39 29 11	2916
	Pollux E.	41 1 48	2902	39 28 41	2920	37 55 30	2955	36 22 14	2953
	Jupiter E.	74 11 47	2948	72 38 22	2941	71 4 47	2932	69 31 1	2924
	Regulus E.	77 40 57	2908	76 6 39	2799	74 32 10	2791	72 57 30	2783
	Saturn E.	87 10 20	2944	85 36 49	2936	84 3 8	2927	82 29 15	2919
	Venus E.	105 43 21	2937	104 17 56	2929	102 52 21	2920	101 26 36	2910
2	$\alpha$ Pegasi W.	90 20 25	2938	91 52 59	2990	93 25 44	2970	94 58 41	2962
	$\alpha$ Arietis W.	47 22 9	2761	48 57 26	2759	50 32 57	2745	52 8 42	2732
	Jupiter E.	61 39 27	2782	60 4 35	2772	58 29 30	2763	56 54 14	2755
	Regulus E.	65 1 29	2741	63 25 43	2732	61 49 45	2723	60 13 36	2714
	Saturn E.	74 37 11	2777	73 2 13	2769	71 27 3	2760	69 51 41	2750
	Venus E.	94 15 4	2164	92 48 12	2155	91 21 9	2145	89 53 54	2136
3	$\alpha$ Arietis W.	60 10 51	2980	61 47 58	2999	63 25 20	2959	65 2 56	2948
	Aldebaran W.	28 45 56	2900	30 18 16	2967	31 51 16	2938	33 24 54	2911
	Jupiter E.	48 54 55	2708	47 18 26	2698	45 41 44	2689	44 4 50	2680
	Regulus E.	52 9 50	2699	50 32 28	2689	48 54 53	2680	47 17 6	2640
	Saturn E.	61 51 56	2704	60 15 21	2695	58 38 35	2687	57 1 37	2676
	Venus E.	82 34 41	2696	81 6 14	2675	79 37 34	2665	78 8 41	2654
	SUN E.	125 34 3	2681	124 4 20	2619	122 34 40	2608	121 4 37	2596
4	$\alpha$ Arietis W.	73 14 36	2993	74 53 41	2992	76 33 1	2970	78 12 37	2959
	Aldebaran W.	41 21 6	2702	42 57 43	2684	44 34 45	2665	46 12 12	2649
	Jupiter E.	35 57 8	2682	34 18 57	2634	32 40 34	2610	31 1 59	2606
	Regulus E.	39 4 53	2692	37 25 47	2683	35 46 29	2673	34 6 57	2664
	Saturn E.	48 53 32	2629	47 15 17	2620	45 36 49	2611	43 58 8	2601
	Venus E.	70 41 0	2600	69 10 47	2599	67 40 20	2578	66 9 40	2567
	SUN E.	113 30 39	2586	111 59 6	2524	110 27 17	2512	108 55 13	2500
5	$\alpha$ Arietis W.	86 34 33	2901	88 15 45	2489	89 57 13	2478	91 38 57	2466
	Aldebaran W.	54 25 0	2699	56 4 38	2654	57 44 36	2639	59 24 55	2624
	Saturn E.	35 41 40	2639	34 1 48	2641	32 21 46	2645	30 41 35	2639
	Venus E.	58 32 45	2611	57 0 40	2600	55 28 21	2598	53 55 47	2587
	SUN E.	101 10 55	2635	99 37 13	2594	98 3 16	2611	96 29 2	2796
6	Aldebaran W.	67 51 29	2464	69 33 47	2441	71 16 23	2427	72 59 19	2414
	Pollux W.	25 50 20	2922	27 31 3	2496	29 12 23	2471	30 54 17	2448
	Venus E.	46 9 27	2924	44 35 30	2914	43 1 20	2905	41 26 58	2796
	SUN E.	88 33 37	2722	86 57 40	2719	85 21 26	2707	83 44 56	2694
7	Aldebaran W.	81 38 36	2361	83 23 21	2339	85 8 23	2327	86 53 43	2316
	Pollux W.	39 31 1	2356	41 15 39	2341	43 0 40	2326	44 46 3	2311
	Venus E.	33 32 31	2703	31 57 13	2706	30 21 50	2767	28 46 26	2737
	SUN E.	75 38 3	2630	73 59 49	2616	72 21 19	2607	70 42 33	2604
8	Aldebaran W.	95 44 25	2263	97 31 19	2253	99 18 27	2244	101 5 49	2235
	Pollux W.	53 38 2	2245	55 25 22	2222	57 13 0	2222	59 0 54	2212
	Jupiter W.	19 19 40	2294	21 5 48	2277	22 52 22	2280	24 39 22	2244
	Regulus W.	16 38 26	2280	18 24 55	2267	20 11 58	2236	21 59 29	2230
	SUN E.	62 24 42	2629	60 44 23	2626	59 3 48	2620	57 23 3	2609
9	Pollux W.	68 4 13	2166	69 53 33	2157	71 43 6	2180	73 32 49	2142
	Jupiter W.	33 39 20	2166	35 28 9	2177	37 17 11	2168	39 6 27	2161



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
1	$\alpha$ Pegasi W.	84 12 0	2924	85 43 49	2915	87 15 49	2905	88 48 1	2896
	$\alpha$ Arietis W.	41 3 19	2908	42 37 40	2794	44 12 16	2783	45 47 6	2773
	Pollux E.	34 48 55	2861	33 15 33	2860	31 42 10	2860	30 8 47	2861
	Jupiter E.	67 57 4	2818	66 22 56	2808	64 48 38	2798	63 14 8	2790
	Regulus E.	71 22 40	2776	69 47 39	2765	68 12 27	2767	66 37 3	2760
	Saturn E.	80 55 12	2811	79 20 59	2802	77 46 34	2794	76 11 58	2786
	Venus E.	100 0 39	2301	98 34 31	2198	97 8 13	2183	95 41 44	2174
2	$\alpha$ Pegasi W.	96 31 49	2964	98 5 7	2945	99 38 36	2938	101 12 15	2929
	$\alpha$ Arietis W.	53 44 40	2721	55 20 52	2710	56 57 18	2701	58 33 57	2699
	Jupiter E.	55 18 47	2748	53 43 7	2736	52 7 15	2727	50 31 11	2718
	Regulus E.	58 37 15	2706	57 0 42	2695	55 23 57	2687	53 47 0	2678
	Saturn E.	68 16 8	2741	66 40 23	2732	65 4 26	2723	63 28 17	2714
	Venus E.	88 26 28	2126	86 58 49	2116	85 30 59	2106	84 2 56	2096
	SUN E.								
3	$\alpha$ Arietis W.	66 40 46	2637	68 18 51	2626	69 57 11	2616	71 35 46	2604
	Aldebaran W.	34 59 8	2785	36 33 55	2768	38 9 11	2742	39 44 55	2722
	Jupiter E.	42 27 43	2670	40 50 23	2661	39 12 51	2652	37 35 6	2642
	Regulus E.	45 39 5	2630	44 0 51	2621	42 22 25	2611	40 43 45	2602
	Saturn E.	55 24 25	2606	53 47 0	2598	59 9 24	2588	50 31 34	2589
	Venus E.	76 39 35	2043	75 10 16	2033	73 40 44	2022	72 10 59	2011
	SUN E.	119 34 19	2064	118 3 46	2073	116 32 59	2060	115 1 56	2049
4	$\alpha$ Arietis W.	79 52 28	2547	81 32 36	2536	83 12 59	2526	84 53 38	2518
	Aldebaran W.	47 50 1	2632	49 28 13	2615	51 6 47	2599	52 45 43	2584
	Jupiter E.	29 23 12	2697	27 44 13	2680	26 5 3	2662	24 25 43	2673
	Regulus E.	32 27 13	2556	30 47 16	2546	29 7 7	2538	27 26 46	2529
	Saturn E.	42 19 14	2568	40 40 9	2564	39 0 52	2574	37 21 22	2566
	Venus E.	64 38 46	2066	63 7 38	2044	61 36 15	2032	60 4 37	2021
	SUN E.	107 22 54	2097	105 50 19	2074	104 17 27	2062	102 44 19	2049
5	$\alpha$ Arietis W.	93 20 59	2454	95 3 17	2443	96 45 52	2430	98 28 44	2418
	Aldebaran W.	61 5 35	2610	62 46 34	2497	64 27 52	2482	66 9 31	2468
	Saturn E.	29 1 16	2684	27 20 50	2632	25 40 21	2630	23 59 50	2633
	Venus E.	52 22 59	2098	50 49 56	2066	49 16 40	2046	47 43 10	2033
	SUN E.	94 54 31	2786	93 19 43	2772	91 44 38	2759	90 9 16	2746
6	Aldebaran W.	74 42 34	2401	76 26 7	2396	78 9 59	2376	79 54 9	2364
	Pollux W.	32 36 43	2428	34 19 38	2409	36 3 0	2391	37 46 48	2374
	Venus E.	39 52 25	2787	38 17 40	2779	36 42 45	2773	35 7 42	2767
	SUN E.	82 8 8	2081	80 31 2	2068	78 53 39	2056	77 16 0	2043
7	Aldebaran W.	88 39 19	2304	90 25 12	2294	92 11 21	2288	93 57 46	2273
	Pollux W.	46 31 47	2397	48 17 51	2383	50 4 15	2369	51 51 0	2356
	Venus E.	27 11 2	2760	25 35 41	2766	24 0 29	2777	22 25 31	2798
	SUN E.	69 3 30	2063	67 24 11	2072	65 44 37	2060	64 4 47	2049
8	Aldebaran W.	102 53 24	2227	104 41 11	2219	106 29 10	2212	108 17 19	2206
	Pollux W.	60 49 4	2301	62 37 30	2191	64 26 11	2182	66 15 5	2173
	Jupiter W.	26 26 44	2231	28 14 26	2218	30 2 27	2206	31 50 45	2196
	Regulus W.	23 47 26	2206	25 35 45	2192	27 24 25	2180	29 13 23	2170
	SUN E.	55 42 2	2001	54 0 50	2002	52 19 26	2004	50 37 50	2007
9	Pollux W.	75 22 43	2137	77 12 46	2131	79 2 58	2126	80 53 17	2121
	Jupiter W.	40 55 53	2154	42 45 30	2147	44 35 17	2141	46 25 13	2136



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
9	Regulus W.	31 2 37	2187	32 52 7	2180	34 41 51	2141	36 31 47	2122
	Saturn W.	21 21 22	2044	23 8 3	2086	24 55 18	2087	26 43 4	2019
	SUN E.	48 56 4	2470	47 14 8	2463	45 32 3	2488	43 49 50	2453
10	Pollux W.	82 43 44	2117	84 34 17	2115	86 24 54	2112	88 15 35	2110
	Jupiter W.	48 15 16	2132	50 5 27	2128	51 55 44	2125	53 46 5	2122
	Regulus W.	45 44 13	2104	47 35 6	2099	49 26 6	2096	51 17 11	2094
	Saturn W.	35 47 6	2187	37 36 39	2180	39 26 22	2144	41 16 14	2139
	SUN E.	35 17 24	2441	33 34 48	2441	31 52 12	2444	30 9 40	2447
14	SUN W.	20 6 45	2722	21 42 56	2726	23 19 3	2739	24 55 5	2736
	Mars E.	73 25 58	2606	71 44 51	2620	70 4 7	2638	68 23 46	2654
	Fomalhaut E.	79 9 8	2706	77 32 36	2726	75 56 33	2780	74 20 59	2772
	α Pegasi E.	99 56 18	2449	98 13 53	2462	96 31 46	2477	94 50 0	2491
15	SUN W.	32 51 59	2795	34 26 32	2811	36 0 45	2828	37 34 37	2844
	Mars E.	60 8 1	2626	58 30 6	2663	56 52 36	2681	55 15 32	2701
	Fomalhaut E.	66 31 14	2609	64 59 6	2629	63 27 36	2671	61 56 47	2695
	α Pegasi E.	86 26 36	2674	84 47 6	2692	83 8 0	2611	81 29 20	2629
16	SUN W.	45 18 36	2681	46 50 16	2648	48 21 34	2666	49 52 30	2683
	Mars E.	47 16 40	2799	45 42 12	2821	44 8 9	2839	42 34 33	2860
	Fomalhaut E.	54 34 2	2205	53 7 59	2262	51 42 51	2301	50 18 41	2322
	α Pegasi E.	73 22 29	2720	71 46 29	2760	70 10 55	2772	68 35 50	2798
17	SUN W.	57 21 33	2672	58 50 15	2691	60 18 36	2708	61 46 36	2725
	Mars E.	34 53 8	2664	33 22 10	2696	31 51 39	2607	30 21 34	2628
	α Pegasi E.	60 47 33	2605	59 15 22	2680	57 43 41	2664	56 12 30	2678
	α Arietis E.	102 46 49	2717	101 10 32	2723	99 34 36	2730	97 59 2	2766
18	SUN W.	69 1 30	2207	70 27 31	2223	71 53 13	2228	73 18 37	2252
	α Pegasi E.	48 44 32	2112	47 16 37	2141	45 49 17	2171	44 22 33	2208
	α Arietis E.	90 6 24	2643	88 32 52	2687	86 59 38	2672	85 26 43	2686
19	SUN W.	80 21 26	2220	81 45 14	2222	83 8 47	2246	84 32 6	2266
	α Arietis E.	77 46 25	2260	76 15 9	2261	74 44 7	2278	73 13 20	2293
	Aldebaran E.	110 9 51	2695	108 39 33	2606	107 9 28	2616	105 39 35	2695
20	SUN W.	91 25 41	2405	92 47 51	2414	94 9 52	2429	95 31 45	2439
	α Arietis E.	65 42 34	2081	64 13 0	2089	62 43 35	2047	61 14 21	2054
	Aldebaran E.	98 12 59	2693	96 44 10	2675	95 15 30	2692	93 46 59	2689
21	SUN W.	102 19 9	2459	103 40 19	2463	105 1 24	2467	106 22 25	2470
	α Aquilæ W.	47 14 56	2245	48 22 40	2194	49 31 12	2147	50 40 28	2108
	α Arietis E.	53 50 12	2035	52 21 44	2091	50 53 23	2094	49 25 6	2099
	Aldebaran E.	86 26 13	2116	84 58 23	2119	83 30 37	2124	82 2 56	2127
22	SUN W.	113 6 48	2480	114 27 35	2480	115 48 22	2479	117 9 10	2480
	α Aquilæ W.	56 36 6	2095	57 48 50	2009	59 2 1	2022	60 15 39	2026
	Mars W.	23 30 3	2408	24 52 16	2306	26 14 38	2280	27 37 7	2292
	α Arietis E.	42 4 51	2114	40 36 59	2117	39 9 10	2119	37 41 24	2121
	Aldebaran E.	74 45 22	2126	73 17 58	2129	71 50 36	2129	70 23 14	2140
23	SUN W.	123 53 24	2470	125 14 22	2467	126 35 23	2468	127 56 28	2469
	α Aquilæ W.	66 29 34	2755	67 45 23	2727	69 1 31	2721	70 17 56	2704



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
		° ' "		° ' "		° ' "		° ' "	
9	Regulus W.	38 21 57	2186	40 12 17	2119	42 2 47	2120	43 53 26	2108
	Saturn W.	28 31 15	2611	30 19 47	2602	32 8 38	2704	33 57 45	2785
	SUN E.	42 7 30	2449	40 25 5	2445	38 42 35	2442	37 0 0	2441
10	Pollux W.	90 6 19	2109	91 57 5	2108	93 47 52	2108	95 38 39	2107
	Jupiter W.	55 36 30	2190	57 26 59	2119	59 17 29	2118	61 8 0	2118
	Regulus W.	53 8 19	2092	54 59 30	2091	56 50 43	2190	58 41 57	2090
	Saturn W.	43 6 14	2186	44 56 19	2182	46 46 29	2181	48 36 41	2129
	SUN E.	28 27 12	2443	26 44 52	2460	25 2 42	2470	23 20 46	2422
14	SUN W.	26 30 57	2746	28 6 36	2787	29 42 0	2769	31 17 9	2783
	Mars E.	66 43 49	2670	65 4 16	2690	63 25 6	2607	61 46 21	2626
	Fomalhaut E.	72 45 54	2797	71 11 22	2683	69 37 24	2680	68 4 1	2678
	α Pegasi E.	93 8 34	2507	91 27 30	2522	89 46 49	2580	88 6 30	2567
15	SUN W.	39 8 8	2690	40 41 18	2677	42 14 6	2694	43 46 32	2612
	Mars E.	53 38 53	2791	52 2 41	2740	50 26 55	2760	48 51 34	2780
	Fomalhaut E.	60 26 41	2642	58 57 20	2679	57 28 45	2119	56 0 58	2161
	α Pegasi E.	79 51 4	2649	78 13 16	2696	76 35 53	2690	74 58 58	2708
16	SUN W.	51 23 4	2682	52 53 14	2620	54 23 2	2697	55 52 29	2608
	Mars E.	41 1 23	2682	39 28 39	2691	37 56 22	2622	36 24 32	2642
	Fomalhaut E.	48 55 30	2409	47 33 24	2409	46 12 25	2532	44 52 36	2599
	α Pegasi E.	67 1 13	2616	65 27 5	2687	63 53 25	2680	62 20 15	2662
17	SUN W.	63 14 15	2142	64 41 33	2159	66 8 31	2175	67 35 10	2191
	Mars E.	28 51 57	2682	27 22 47	2673	25 54 6	2696	24 25 54	2128
	α Pegasi E.	54 41 50	2603	53 11 41	2680	51 42 5	2696	50 13 1	2694
	α Arietis E.	96 23 49	2782	94 48 58	2797	93 14 26	2613	91 40 15	2629
18	SUN W.	74 43 43	2267	76 8 33	2282	77 33 6	2294	78 57 24	2308
	α Pegasi E.	42 56 27	2226	41 31 1	2271	40 6 16	2309	38 42 15	2349
	α Arietis E.	83 54 6	2699	82 21 46	2612	80 49 43	2225	79 17 56	2686
19	SUN W.	85 55 13	2365	87 18 7	2378	88 40 49	2387	90 3 20	2396
	α Arietis E.	71 42 46	2993	70 12 25	2694	68 42 17	2613	67 12 20	2622
	Aldebaran E.	104 9 54	2684	102 40 23	2644	101 11 5	2682	99 41 57	2690
20	SUN W.	96 53 26	2426	98 15 2	2442	99 36 31	2448	100 57 53	2454
	α Arietis E.	59 45 15	2661	58 16 18	2698	56 47 29	2673	55 18 47	2679
	Aldebaran E.	92 18 36	2695	90 50 20	2101	89 22 11	2106	87 54 9	2111
21	SUN W.	107 43 23	2472	109 4 18	2476	110 25 9	2477	111 45 59	2478
	α Aquilæ W.	51 50 24	2666	53 0 59	2691	54 12 8	2697	55 23 51	2664
	α Arietis E.	47 56 55	2102	46 28 48	2105	45 0 45	2109	43 32 46	2112
	Aldebaran E.	80 35 19	2129	79 7 45	2133	77 40 15	2136	76 12 48	2136
22	SUN W.	118 29 57	2478	119 50 46	2477	121 11 36	2475	122 32 28	2471
	α Aquilæ W.	61 29 41	2686	62 44 7	2614	63 58 55	2793	65 14 4	2774
	Mars W.	28 59 44	2377	30 22 27	2370	31 45 18	2365	33 8 15	2368
	α Arietis E.	36 13 40	2124	34 45 59	2126	33 18 21	2129	31 50 46	2121
	Aldebaran E.	68 55 53	2140	67 28 32	2140	66 1 11	2140	64 33 50	2138
23	SUN W.	129 17 37	2455	130 38 51	2462	132 0 9	2446	133 21 33	2445
	α Aquilæ W.	71 34 39	2689	72 51 38	2674	74 8 53	2661	75 26 22	2646



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	Fomalhaut W.	41 56 24	4060	43 7 5	4003	44 18 42	3850	45 31 11	3908
	Mars W.	34 31 19	3853	35 54 29	3847	37 17 46	3842	38 41 9	3335
	Aldebaran E.	63 6 27	3138	61 39 3	3137	60 11 38	3136	58 44 12	3134
	Pollux E.	105 2 54	3095	103 34 38	3091	102 6 18	3088	100 37 54	3083
24	$\alpha$ Aquilæ W.	76 44 7	3633	78 2 6	3621	79 20 18	3609	80 38 43	3598
	Fomalhaut W.	51 44 47	3707	53 1 27	3676	54 18 40	3644	55 36 27	3617
	Mars W.	45 39 58	3802	47 4 7	3294	48 28 25	3288	49 52 50	3279
	$\alpha$ Pegasi W.	29 0 5	3742	30 16 8	3679	31 33 27	3610	32 51 51	3598
	Aldebaran E.	51 26 30	3125	49 58 51	3124	48 31 10	3122	47 3 27	3121
	Pollux E.	93 14 28	3088	91 45 27	3052	90 16 19	3047	88 47 4	3041
25	$\alpha$ Aquilæ W.	87 13 48	3545	88 33 22	3538	89 53 4	3528	91 12 56	3522
	Fomalhaut W.	62 12 29	3494	63 33 0	3473	64 53 54	3452	66 15 13	3433
	Mars W.	56 57 22	3238	58 22 46	3231	59 48 19	3220	61 14 3	3213
	$\alpha$ Pegasi W.	39 36 28	3860	40 59 30	3830	42 23 7	3801	43 47 17	3776
	Aldebaran E.	39 44 35	3120	38 16 50	3122	36 49 7	3125	35 21 28	3129
	Pollux E.	81 18 44	3005	79 48 37	2997	78 18 20	2989	76 47 54	2982
	Jupiter E.	116 51 47	3007	115 21 43	2997	113 51 27	2989	112 21 1	2981
	Saturn E.	117 3 31	2945	115 32 11	2936	114 0 38	2926	112 28 52	2916
26	Fomalhaut W.	73 6 54	3345	74 30 13	3331	75 53 49	3314	77 17 44	3301
	Mars W.	68 25 33	3163	69 52 26	3155	71 19 29	3148	72 46 46	3134
	$\alpha$ Pegasi W.	50 55 20	3162	52 22 15	3142	53 49 34	3124	55 17 14	3106
	Pollux E.	69 13 13	2940	67 41 45	2932	66 10 7	2924	64 38 18	2915
	Jupiter E.	104 46 8	2936	103 14 35	2926	101 42 49	2916	100 10 51	2908
	Saturn E.	117 3 31	2945	115 32 11	2936	114 0 38	2926	112 28 52	2916
	Saturn E.	117 3 31	2945	115 32 11	2936	114 0 38	2926	112 28 52	2916
27	Fomalhaut W.	84 21 12	3236	85 46 38	3225	87 12 18	3214	88 38 10	3206
	Mars W.	80 6 10	3082	81 34 41	3073	83 3 23	3063	84 32 18	3053
	$\alpha$ Pegasi W.	62 40 50	3025	64 10 32	3011	65 40 31	2998	67 10 49	2985
	Pollux E.	56 56 32	2873	55 23 38	2866	53 50 35	2857	52 17 21	2849
	Jupiter E.	92 28 2	2859	90 54 50	2848	89 21 25	2838	87 47 47	2829
	Regulus E.	93 44 34	2841	92 10 59	2831	90 37 13	2821	89 3 12	2811
	Saturn E.	104 46 56	2866	103 13 54	2856	101 40 30	2847	100 7 19	2837
	Saturn E.	104 46 56	2866	103 13 54	2856	101 40 30	2847	100 7 19	2837
28	Fomalhaut W.	95 50 15	3163	97 17 9	3156	98 44 11	3149	100 11 21	3144
	Mars W.	92 0 2	3001	93 30 13	2992	95 0 36	2982	96 31 11	2973
	$\alpha$ Pegasi W.	74 46 31	2918	76 18 27	2906	77 50 38	2895	79 23 3	2883
	$\alpha$ Arietis W.	31 22 31	2814	32 56 41	2800	34 31 9	2785	36 5 56	2773
	Pollux E.	44 28 46	2814	42 54 36	2808	41 20 19	2803	39 45 55	2798
	Jupiter E.	79 56 31	2782	78 21 38	2771	76 46 32	2761	75 11 13	2752
	Regulus E.	81 10 2	2768	79 34 46	2764	77 59 18	2744	76 23 37	2736
	Saturn E.	92 16 43	2788	90 41 59	2778	89 7 2	2769	87 31 53	2759
	Saturn E.	92 16 43	2788	90 41 59	2778	89 7 2	2769	87 31 53	2759
29	Mars W.	104 7 11	2924	105 38 59	2916	107 10 58	2906	108 43 9	2896
	$\alpha$ Arietis W.	44 3 55	2713	45 40 17	2703	47 16 53	2692	48 53 43	2681
	Jupiter E.	67 11 34	2705	65 35 1	2696	63 58 16	2688	62 21 20	2679
	Regulus E.	68 22 11	2689	66 45 17	2681	65 8 12	2672	63 30 54	2668
	Saturn E.	79 32 59	2713	77 56 36	2704	76 20 1	2696	74 43 14	2687
30	$\alpha$ Arietis W.	57 1 18	2683	58 39 28	2684	60 17 50	2615	61 56 24	2606
	Aldebaran W.	25 43 24	2906	27 15 36	2896	28 48 39	2882	30 22 25	2871
	Jupiter E.	54 13 46	2688	52 35 42	2629	50 57 27	2622	49 19 2	2615
	Regulus E.	55 21 36	2623	53 43 11	2614	52 4 35	2607	50 25 49	2599
	Saturn E.	66 36 29	2645	64 58 35	2638	63 20 31	2629	61 42 16	2621



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXTh.	P. L. of Dist.
23	Fomalhaut W.	46 44 28	3657	47 58 31	3616	49 13 17	3778	50 28 42	3740
	Mars W.	40 4 40	3628	41 28 19	3623	42 52 4	3817	44 15 56	3308
	Aldebaran E.	57 16 44	3133	55 49 13	3131	54 21 41	3129	52 54 6	3128
	Pollux E.	99 9 24	3079	97 40 49	3075	96 12 9	3069	94 43 21	3065
24	$\alpha$ Aquilæ W.	81 57 20	3686	83 16 10	3673	84 35 12	3665	85 54 25	3656
	Fomalhaut W.	56 54 43	3680	58 13 29	3665	59 32 42	3639	60 52 23	3616
	Mars W.	51 17 26	3371	52 42 11	3364	54 7 5	3366	55 32 8	3247
	$\alpha$ Pegasi W.	34 11 11	3613	35 31 21	3471	36 52 18	3480	38 14 1	3391
	Aldebaran E.	45 35 43	3119	44 7 57	3119	42 40 10	3118	41 12 22	3119
	Pollux E.	87 17 42	3033	85 48 10	3026	84 18 30	3020	82 48 42	3012
25	$\alpha$ Aquilæ W.	92 32 56	3615	93 53 4	3408	95 13 19	3401	96 33 42	3406
	Fomalhaut W.	67 36 51	3414	68 58 52	3396	70 21 13	3379	71 43 54	3362
	Mars W.	62 39 59	3302	64 6 6	3193	65 32 23	3183	66 58 53	3174
	$\alpha$ Pegasi W.	45 11 57	3250	46 37 7	3225	48 2 46	3204	49 28 50	3183
	Aldebaran E.	33 53 54	3136	32 26 28	3143	30 59 11	3164	29 32 7	3109
	Pollux E.	75 17 19	2973	73 46 33	2965	72 15 37	2967	70 44 30	2949
	Jupiter E.	110 50 25	2977	109 19 38	2963	107 48 39	2964	106 17 29	2946
	Saturn E.								
26	Fomalhaut W.	78 41 54	3267	80 6 21	3273	81 31 4	3262	82 56 0	3248
	Mars W.	74 14 14	3124	75 41 55	3114	77 9 48	3105	78 37 52	3093
	$\alpha$ Pegasi W.	56 45 16	3098	58 13 40	3072	59 42 24	3066	61 11 28	3041
	Pollux E.	63 6 18	2906	61 34 7	2898	60 1 46	2891	58 29 15	2881
	Jupiter E.	98 38 42	2998	97 6 20	2989	95 33 47	2979	94 1 1	2970
	Saturn E.	110 56 54	2906	109 24 43	2897	107 52 20	2897	106 19 45	2876
27	Fomalhaut W.	90 4 12	3194	91 30 28	3186	92 56 54	3178	94 23 30	3170
	Mars W.	86 1 26	3042	87 30 47	3032	89 0 20	3023	90 30 4	3013
	$\alpha$ Pegasi W.	68 41 24	2969	70 12 16	2965	71 43 25	2942	73 14 50	2930
	Pollux E.	50 43 57	2842	49 10 23	2835	47 36 40	2828	46 2 48	2820
	Jupiter E.	86 13 57	2921	84 39 55	2910	83 5 40	2799	81 31 11	2791
	Regulus E.	87 28 59	2802	85 54 34	2792	84 19 56	2779	82 45 6	2772
	Saturn E.	98 33 32	2827	96 59 39	2817	95 25 33	2807	93 51 14	2798
28	Fomalhaut W.	101 38 36	3140	103 5 57	3137	104 33 22	3133	106 0 51	3121
	Mars W.	98 1 59	2962	99 32 59	2963	101 4 11	2943	102 35 35	2934
	$\alpha$ Pegasi W.	80 55 43	2973	82 28 37	2962	84 1 45	2962	85 35 5	2942
	$\alpha$ Arietis W.	37 40 59	2780	39 16 19	2747	40 51 56	2736	42 27 48	2726
	Pollux E.	38 11 24	2794	36 36 48	2791	35 2 8	2787	33 27 23	2786
	Jupiter E.	73 35 42	2743	71 59 59	2733	70 24 3	2723	68 47 54	2715
	Regulus E.	74 47 45	2726	73 11 40	2716	71 35 22	2707	69 58 52	2699
	Saturn E.	85 56 31	2749	84 20 56	2740	82 45 9	2731	81 9 10	2722
29	Mars W.	110 15 31	2988	111 48 5	2980	113 20 50	2971	114 53 46	2962
	$\alpha$ Arietis W.	50 30 48	2972	52 8 6	2962	53 45 37	2962	55 23 21	2943
	Jupiter E.	60 44 12	2971	59 6 53	2962	57 29 22	2964	55 51 39	2945
	Regulus E.	61 53 25	2965	60 15 45	2946	58 37 53	2938	56 59 50	2930
	Saturn E.	73 6 16	2978	71 29 6	2969	69 51 44	2961	68 14 12	2953
30	$\alpha$ Arietis W.	63 35 11	2998	65 14 9	2989	66 53 19	2981	68 32 40	2972
	Aldebaran W.	31 56 52	2774	33 31 54	2760	35 7 28	2757	36 43 32	2707
	Jupiter E.	47 40 27	2907	46 1 42	2900	44 22 47	2893	42 43 42	2885
	Regulus E.	48 46 52	2891	47 7 45	2884	45 28 28	2877	43 49 2	2870
	Saturn E.	60 3 50	2818	58 25 15	2807	56 46 30	2800	55 7 35	2893



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Merid-ian.	Equation of Time, to be subtracted from		Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.	added to Apparent Time.				
		h. m. s.	s.	S. ° ' "	"	' "	s.	m. s.	s.		
Sat.	1	16 31 37.81	10.809	S. 21 54 15.3	22.78	16 16.14	70.36	10 35.95	0.953		
Sun.	2	16 35 57.63	10.835	22 3 9.8	21.72	16 16.28	70.44	10 12.76	0.979		
Mon.	3	16 40 18.07	10.861	22 11 38.7	20.65	16 16.42	70.52	9 48.95	1.005		
Tues.	4	16 44 39.12	10.886	22 19 41.7	19.57	16 16.55	70.60	9 24.53	1.030		
Wed.	5	16 49 0.76	10.910	22 27 18.6	18.49	16 16.67	70.67	8 59.51	1.054		
Thur.	6	16 53 22.95	10.932	22 34 29.4	17.39	16 16.79	70.74	8 33.95	1.077		
Fri.	7	16 57 45.66	10.953	22 41 13.7	16.28	16 16.91	70.80	8 7.86	1.097		
Sat.	8	17 2 8.88	10.973	22 47 31.2	15.15	16 17.02	70.86	7 41.27	1.117		
Sun.	9	17 6 32.57	10.993	22 53 21.6	14.03	16 17.13	70.92	7 14.21	1.136		
Mon.	10	17 10 56.70	11.011	22 58 44.9	12.89	16 17.23	70.98	6 46.71	1.154		
Tues.	11	17 15 21.24	11.027	23 3 40.9	11.76	16 17.33	71.03	6 18.81	1.170		
Wed.	12	17 19 46.16	11.042	23 8 9.4	10.61	16 17.43	71.07	5 50.53	1.185		
Thur.	13	17 24 11.41	11.055	23 12 10.4	9.46	16 17.53	71.11	5 21.91	1.197		
Fri.	14	17 28 36.96	11.067	23 15 43.5	8.29	16 17.62	71.15	4 53.00	1.209		
Sat.	15	17 33 2.77	11.077	23 18 48.7	7.13	16 17.70	71.19	4 23.83	1.219		
Sun.	16	17 37 28.81	11.085	23 21 25.8	5.96	16 17.78	71.22	3 54.43	1.228		
Mon.	17	17 41 55.04	11.091	23 23 34.8	4.79	16 17.86	71.24	3 24.83	1.234		
Tues.	18	17 46 21.41	11.096	23 25 15.7	3.61	16 17.94	71.26	2 55.10	1.240		
Wed.	19	17 50 47.89	11.101	23 26 28.4	2.44	16 18.01	71.28	2 25.26	1.244		
Thur.	20	17 55 14.45	11.104	23 27 12.9	1.26	16 18.08	71.30	1 55.34	1.247		
Fri.	21	17 59 41.07	11.104	23 27 29.0	0.08	16 18.14	71.30	1 25.36	1.248		
Sat.	22	18 4 7.70	11.104	23 27 16.9	1.10	16 18.19	71.30	0 55.37	1.248		
Sun.	23	18 8 34.31	11.102	23 26 36.5	2.28	16 18.24	71.30	0 25.41	1.246		
Mon.	24	18 13 0.85	11.100	23 25 27.7	3.46	16 18.29	71.30	0 4.49	1.243		
Tues.	25	18 17 27.30	11.096	23 23 50.6	4.63	16 18.33	71.29	0 34.30	1.239		
Wed.	26	18 21 53.64	11.091	23 21 45.3	5.80	16 18.36	71.27	1 4.00	1.234		
Thur.	27	18 26 19.83	11.084	23 19 11.9	6.97	16 18.38	71.25	1 33.55	1.227		
Fri.	28	18 30 45.85	11.076	23 16 10.5	8.14	16 18.40	71.22	2 2.93	1.219		
Sat.	29	18 35 11.67	11.067	23 12 41.1	9.30	16 18.41	71.19	2 32.11	1.209		
Sun.	30	18 39 37.26	11.057	23 8 43.9	10.46	16 18.42	71.16	3 1.06	1.200		
Mon.	31	18 44 2.59	11.046	23 4 18.8	11.61	16 18.42	71.12	3 29.75	1.189		
Tues.	32	18 48 27.62	11.033	S. 22 59 26.1	12.76	16 18.42	71.08	3 58.14	1.176		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.



## AT GREENWICH MEAN NOON.

AT GREENWICH MEAN NOON.															
Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be added to	Diff. for 1 hour.	Sidereal Time.					
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.	subtracted from Mean Time.							
		h.	m.	s.	°	'	"	m.			s.				
Sat.	1	16	31	30.72	10.809	S. 21	54	19.4	22.78	10	35.78	0.953	16	42	15.50
Sun.	2	16	35	59.47	10.835	22	3	13.5	21.72	10	12.59	0.979	16	46	12.06
Mon.	3	16	40	19.84	10.861	22	11	42.1	20.65	9	48.78	1.005	16	50	8.62
Tues.	4	16	44	40.82	10.886	22	19	44.8	19.57	9	24.36	1.030	16	54	5.18
Wed.	5	16	49	2.39	10.910	22	27	21.4	18.49	8	59.35	1.054	16	58	1.74
Thur.	6	16	53	24.51	10.932	22	34	31.9	17.39	8	33.79	1.077	17	1	58.30
Fri.	7	16	57	47.15	10.953	22	41	15.9	16.28	8	7.70	1.097	17	5	54.85
Sat.	8	17	2	10.29	10.973	22	47	33.1	15.15	7	41.12	1.117	17	9	51.41
Sun.	9	17	6	33.90	10.993	22	53	23.3	14.03	7	14.07	1.136	17	13	47.97
Mon.	10	17	10	57.95	11.011	22	58	46.4	12.89	6	46.58	1.154	17	17	44.53
Tues.	11	17	15	22.41	11.027	23	3	42.2	11.76	6	18.68	1.170	17	21	41.09
Wed.	12	17	19	47.24	11.042	23	8	10.5	10.61	5	50.41	1.185	17	25	37.65
Thur.	13	17	24	12.40	11.055	23	12	11.3	9.46	5	21.80	1.197	17	29	34.20
Fri.	14	17	28	37.85	11.067	23	15	44.2	8.29	4	52.91	1.209	17	33	30.76
Sat.	15	17	33	3.58	11.077	23	18	49.2	7.13	4	23.74	1.219	17	37	27.32
Sun.	16	17	37	29.53	11.085	23	21	26.2	5.96	3	54.35	1.228	17	41	23.88
Mon.	17	17	41	55.67	11.091	23	23	35.1	4.79	3	24.76	1.234	17	45	20.43
Tues.	18	17	46	21.95	11.096	23	25	15.9	3.61	2	55.04	1.240	17	49	16.99
Wed.	19	17	50	48.34	11.101	23	26	28.5	2.44	2	25.21	1.244	17	53	13.55
Thur.	20	17	55	14.81	11.104	23	27	12.9	1.26	1	55.30	1.247	17	57	10.11
Fri.	21	17	59	41.34	11.104	23	27	29.0	0.09	1	25.33	1.248	18	1	6.67
Sat.	22	18	4	7.88	11.104	23	27	16.9	1.10	0	55.35	1.248	18	5	3.23
Sun.	23	18	8	34.39	11.102	23	26	36.5	2.28	0	25.40	1.246	18	8	59.79
Mon.	24	18	13	0.83	11.100	23	25	27.7	3.46	0	4.49	1.243	18	12	56.34
Tues.	25	18	17	27.19	11.096	23	23	50.6	4.63	0	34.29	1.239	18	16	52.90
Wed.	26	18	21	53.44	11.091	23	21	45.4	5.80	1	3.98	1.234	18	20	49.46
Thur.	27	18	26	19.54	11.084	23	19	12.1	6.97	1	33.52	1.227	18	24	46.02
Fri.	28	18	30	45.47	11.076	23	16	10.8	8.14	2	2.89	1.219	18	28	42.56
Sat.	29	18	35	11.20	11.067	23	12	41.5	9.30	2	32.06	1.209	18	32	39.14
Sun.	30	18	39	36.70	11.057	23	8	44.4	10.46	3	1.00	1.200	18	36	35.70
Mon.	31	18	44	1.94	11.046	23	4	19.5	11.61	3	29.68	1.189	18	40	32.26
Tues.	23	18	48	26.88	11.033	S. 22	59	27.0	12.76	3	58.06	1.176	18	44	28.82

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.



## · AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.			Diff. for 1 hour.	LATITUDE.			
		$\lambda$	$\lambda'$						
			$^{\circ}$	$'$					
1	336	249 35 24.1	34 23.4	152.15	—0.15	9.9936666	26.5	h. m. s. 7 16 32.78	
2	337	250 36 16.5	35 15.7	152.20	0.28	.9936041	25.5	7 12 36.87	
3	338	251 37 10.1	36 9.1	152.26	0.42	.9935441	24.5	7 8 40.96	
4	339	252 38 4.9	37 3.7	152.32	0.53	.9934863	23.6	7 4 45.04	
5	340	253 39 1.0	37 59.6	152.37	0.63	.9934306	22.7	7 0 49.13	
6	341	254 39 58.4	38 56.8	152.42	0.71	.9933770	21.9	6 56 53.22	
7	342	255 40 57.0	39 55.3	152.47	0.76	.9933252	21.2	6 52 57.31	
8	343	256 41 56.8	40 54.9	152.52	0.77	.9932751	20.5	6 49 1.40	
9	344	257 42 57.7	41 55.6	152.57	0.77	.9932267	19.8	6 45 5.48	
10	345	258 43 59.7	42 57.4	152.61	0.73	.9931801	19.1	6 41 9.57	
11	346	259 45 2.7	44 0.2	152.64	0.65	.9931350	18.5	6 37 13.66	
12	347	260 46 6.5	45 3.9	152.67	0.55	.9930914	17.9	6 33 17.75	
13	348	261 47 11.1	46 8.3	152.70	0.44	.9930493	17.3	6 29 21.84	
14	349	262 48 16.3	47 13.3	152.73	0.32	.9930087	16.6	6 25 25.92	
15	350	263 49 22.1	48 18.9	152.75	0.19	.9929697	15.9	6 21 30.01	
16	351	264 50 28.3	49 24.9	152.77	—0.06	.9929324	15.2	6 17 34.10	
17	352	265 51 34.9	50 31.4	152.78	+0.06	.9928969	14.4	6 13 38.19	
18	353	266 52 41.8	51 38.1	152.79	0.18	.9928632	13.6	6 9 42.28	
19	354	267 53 48.9	52 45.0	152.80	0.28	.9928314	12.8	6 5 46.36	
20	355	268 54 56.3	53 52.2	152.81	0.33	.9928016	11.9	6 1 50.45	
21	356	269 56 8.8	54 59.5	152.82	0.36	.9927741	10.9	5 57 54.54	
22	357	270 57 11.5	56 7.0	152.82	0.36	.9927490	9.9	5 53 58.63	
23	358	271 58 19.2	57 14.5	152.82	0.32	.9927264	8.8	5 50 2.72	
24	359	272 59 27.0	58 22.1	152.83	0.26	.9927064	7.7	5 46 6.80	
25	360	273 60 34.8	59 29.7	152.83	0.18	.9926891	6.6	5 42 10.89	
26	361	275 1 42.7	0 37.4	152.83	+0.07	.9926747	5.4	5 38 14.98	
27	362	276 2 50.7	1 45.3	152.83	—0.05	.9926631	4.2	5 34 19.07	
28	363	277 3 59.0	2 53.4	152.84	0.18	.9926544	3.1	5 30 23.15	
29	364	278 5 7.5	4 1.7	152.85	0.31	.9926485	1.9	5 26 27.23	
30	365	279 6 16.1	5 10.1	152.86	0.44	.9926454	0.7	5 22 31.32	
31	366	280 7 24.9	6 18.7	152.87	0.57	.9926451	0.6	5 18 35.41	
32	367	281 8 33.9	7 27.5	152.89	—0.67	9.9926474	1.5	5 14 39.50	

NOTE.— $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.



## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
1	15 39.8	15 43.6	57 22.4	+1.17	57 36.1	+1.13	h. m. 14 59.1	m. 2.23	d. 18.5
2	15 47.2	15 50.7	57 49.5	1.10	58 2.4	1.06	15 51.7	2.15	19.5
3	15 54.1	15 57.4	58 14.9	1.02	58 27.0	0.98	16 42.2	2.07	20.5
4	16 0.5	16 3.5	58 38.5	0.94	58 49.4	0.88	17 31.1	2.03	21.5
5	16 6.3	16 8.9	58 59.7	0.83	59 9.2	0.76	18 19.5	2.03	22.5
6	16 11.2	16 13.2	59 17.8	0.67	59 25.2	0.56	19 8.6	2.06	23.5
7	16 14.8	16 16.0	59 31.2	0.48	59 35.5	+0.28	19 59.5	2.18	24.5
8	16 16.7	16 16.8	59 38.0	+0.12	59 38.4	-0.06	20 53.4	2.31	25.5
9	16 16.3	16 15.1	59 36.5	-0.26	59 32.2	0.47	21 50.5	2.43	26.5
10	16 13.2	16 10.6	59 25.3	0.68	59 15.8	0.89	22 50.3	2.50	27.5
11	16 7.4	16 3.5	59 3.8	1.10	58 49.4	1.29	23 51.0	2.50	28.5
12	15 59.0	15 54.0	58 32.8	1.46	58 14.4	1.60	6		29.5
13	15 48.5	15 42.7	57 54.4	1.71	57 33.3	1.79	0 50.4	2.40	1.0
14	15 36.8	15 30.8	57 11.4	1.83	56 49.3	1.84	1 46.4	2.24	2.0
15	15 24.8	15 18.9	56 27.3	1.81	56 5.9	1.73	2 38.0	2.06	3.0
16	15 13.4	15 8.3	55 45.7	1.63	55 26.7	1.51	3 25.4	1.90	4.0
17	15 3.6	14 59.4	55 9.5	1.36	54 54.2	1.18	4 9.3	1.78	5.0
18	14 55.8	14 52.9	54 41.1	1.00	54 30.3	0.79	4 50.7	1.70	6.0
19	14 50.7	14 49.2	54 22.1	0.58	54 16.5	-0.36	5 30.8	1.67	7.0
20	14 48.3	14 48.2	54 13.5	-0.14	54 13.1	+0.03	6 10.8	1.68	8.0
21	14 48.9	14 50.3	54 15.5	+0.31	54 20.5	0.52	6 51.6	1.74	9.0
22	14 52.3	14 54.9	54 27.9	0.71	54 37.6	0.90	7 34.4	1.84	10.0
23	14 58.1	15 1.8	54 49.5	1.07	55 3.3	1.22	8 20.1	1.97	11.0
24	15 6.0	15 10.7	55 18.8	1.35	55 35.7	1.46	9 9.3	2.12	12.0
25	15 15.7	15 20.8	55 53.8	1.53	56 12.6	1.58	10 2.0	2.25	13.0
26	15 26.0	15 31.3	56 31.9	1.61	56 51.2	1.60	10 57.5	2.34	14.0
27	15 36.5	15 41.5	57 10.3	1.57	57 28.8	1.50	11 54.5	2.36	15.0
28	15 46.3	15 50.7	57 46.3	1.41	58 2.6	1.30	12 51.0	2.32	16.0
29	15 54.7	15 58.3	58 17.5	1.18	58 30.8	1.03	13 45.9	2.23	17.0
30	16 1.5	16 4.2	58 42.3	0.89	58 52.1	0.74	14 38.3	2.14	18.0
31	16 6.4	16 8.1	59 0.1	0.59	59 6.3	0.44	15 28.6	2.07	19.0
32	16 9.3	16 10.0	59 10.6	+0.28	59 13.0	+0.12	16 17.5	2.02	20.0



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 1.					MONDAY 3.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	7 8 40.65	2.3678	N.23 12 57.6	6.868	1	8 58 37.53	2.3067	N.15 22 28.2	12.262
2	7 11 2.64	2.3661	23 6 2.3	6.990	2	9 0 49.96	2.3055	15 10 4.4	12.440
3	7 13 24.46	2.3623	22 58 58.8	7.127	3	9 3 2.90	2.3032	14 57 35.4	12.607
4	7 15 46.11	2.3595	22 51 47.2	7.262	4	9 5 14.95	2.3002	14 45 1.3	12.622
5	7 18 7.60	2.3568	22 44 27.5	7.397	5	9 7 26.12	2.2992	14 32 22.1	12.685
6	7 20 28.92	2.3539	22 36 59.7	7.530	6	9 9 37.80	2.2982	14 19 37.9	12.779
7	7 22 50.07	2.3510	22 29 23.9	7.663	7	9 11 49.29	2.2992	14 6 48.7	12.861
8	7 25 11.04	2.3480	22 21 40.1	7.796	8	9 14 0.60	2.2972	13 53 54.6	12.942
9	7 27 31.83	2.3460	22 13 48.4	7.928	9	9 16 11.74	2.2942	13 40 55.7	13.021
10	7 29 52.44	2.3420	22 5 46.8	8.060	10	9 18 22.71	2.2913	13 27 52.1	13.080
11	7 32 12.87	2.3399	21 57 41.3	8.190	11	9 20 33.51	2.2885	13 14 43.9	13.175
12	7 34 33.11	2.3368	21 49 26.1	8.318	12	9 22 44.14	2.2877	13 1 31.2	13.260
13	7 36 53.16	2.3326	21 41 3.2	8.445	13	9 24 54.60	2.2880	12 48 14.0	13.334
14	7 39 13.02	2.3298	21 32 32.6	8.573	14	9 27 4.90	2.2895	12 34 52.4	13.397
15	7 41 32.68	2.3260	21 23 54.5	8.698	15	9 29 15.04	2.2877	12 21 26.5	13.468
16	7 43 52.14	2.3226	21 15 8.9	8.823	16	9 31 25.02	2.2860	12 7 56.3	13.536
17	7 46 11.40	2.3198	21 6 15.8	8.947	17	9 33 34.84	2.2834	11 54 21.9	13.600
18	7 48 30.46	2.3168	20 57 15.4	9.069	18	9 35 44.51	2.2808	11 40 43.3	13.677
19	7 50 49.32	2.3125	20 48 7.6	9.191	19	9 37 54.03	2.2778	11 27 0.6	13.746
20	7 53 7.96	2.3090	20 38 52.5	9.312	20	9 40 3.40	2.2749	11 13 13.9	13.811
21	7 55 26.39	2.3055	20 29 30.2	9.432	21	9 42 12.63	2.2727	10 59 23.3	13.875
22	7 57 44.61	2.3020	20 20 0.8	9.550	22	9 44 21.72	2.2698	10 45 28.9	13.937
23	8 0 2.62	2.2985	20 10 24.3	9.668	23	9 46 30.67	2.2661	10 31 30.8	13.999
24	8 2 20.42	2.2950	N.20 0 40.7	9.785	24	9 48 39.49	2.2626	N.10 17 29.1	14.066
SUNDAY 2.					TUESDAY 4.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	8 4 38.01	2.2915	N.19 50 50.1	9.900	1	9 50 48.19	2.2488	N.10 3 23.8	14.118
2	8 6 55.38	2.2880	19 40 52.7	10.014	2	9 52 56.76	2.2418	9 49 15.0	14.176
3	8 9 12.55	2.2845	19 30 48.4	10.128	3	9 55 5.21	2.2390	9 35 2.7	14.232
4	8 11 29.51	2.2810	19 20 37.3	10.242	4	9 57 13.55	2.2360	9 20 47.0	14.288
5	8 13 46.26	2.2775	19 10 19.4	10.355	5	9 59 21.78	2.2332	9 6 28.1	14.343
6	8 16 2.80	2.2740	18 50 54.8	10.467	6	10 1 29.90	2.2344	8 52 5.9	14.397
7	8 18 19.13	2.2705	18 49 23.5	10.577	7	10 3 37.91	2.2327	8 37 40.5	14.460
8	8 20 35.20	2.2671	18 38 45.6	10.686	8	10 5 45.82	2.2310	8 23 12.0	14.500
9	8 22 51.18	2.2636	18 28 1.2	10.794	9	10 7 53.03	2.2284	8 8 40.5	14.560
10	8 25 6.89	2.2601	18 17 10.4	10.900	10	10 10 1.35	2.2279	7 54 6.1	14.608
11	8 27 22.39	2.2566	18 6 13.3	11.004	11	10 12 8.98	2.2265	7 39 28.9	14.654
12	8 29 37.68	2.2531	17 55 10.0	11.107	12	10 14 16.53	2.2261	7 24 48.9	14.699
13	8 31 52.77	2.2496	17 44 0.6	11.209	13	10 16 23.99	2.2238	7 10 6.2	14.733
14	8 34 7.04	2.2461	17 32 45.0	11.310	14	10 18 31.38	2.2226	6 55 20.9	14.776
15	8 36 22.30	2.2426	17 21 23.4	11.410	15	10 20 38.70	2.2214	6 40 33.0	14.818
16	8 38 36.75	2.2391	17 9 55.8	11.510	16	10 22 45.95	2.2203	6 25 42.6	14.859
17	8 40 50.99	2.2357	16 58 22.3	11.609	17	10 24 53.14	2.2193	6 10 49.8	14.898
18	8 43 5.02	2.2322	16 46 42.9	11.708	18	10 27 0.27	2.2183	5 55 54.8	14.935
19	8 45 18.85	2.2288	16 34 57.7	11.802	19	10 29 7.34	2.2174	5 40 57.6	14.972
20	8 47 32.47	2.2254	16 23 6.7	11.898	20	10 31 14.36	2.2166	5 25 58.2	15.008
21	8 49 45.88	2.2220	16 11 10.0	11.992	21	10 33 21.33	2.2158	5 10 56.7	15.043
22	8 51 59.09	2.2186	15 59 7.7	12.084	22	10 35 28.26	2.2151	4 55 53.2	15.074
23	8 54 12.10	2.2152	15 46 59.9	12.175	23	10 37 35.15	2.2145	4 40 47.8	15.105
24	8 56 24.91	2.2119	15 34 46.7	12.265	24	10 39 42.01	2.2140	4 25 40.6	15.135
	8 58 37.53	2.2087	N.15 22 28.2	12.353		10 41 48.84	2.2135	N. 4 10 31.7	15.163



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 5.					FRIDAY 7.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	10 41 48.84	2.1125	N. 4 10 31.7	15.183	0	12 24 16.63	2.1898	S. 8 5 3.5	14.946
1	10 43 55.64	2.1131	3 55 21.1	15.190	1	12 26 27.88	2.1898	8 19 59.0	14.905
2	10 46 2.42	2.1128	3 40 8.9	15.217	2	12 28 39.34	2.1928	8 34 52.1	14.864
3	10 48 9.18	2.1126	3 24 55.1	15.243	3	12 30 51.02	2.1954	8 49 42.7	14.822
4	10 50 15.93	2.1126	3 9 39.8	15.267	4	12 33 2.91	2.2008	9 4 30.7	14.778
5	10 52 23.68	2.1126	2 54 23.1	15.289	5	12 35 15.02	2.2008	9 19 16.0	14.732
6	10 54 39.43	2.1126	2 39 5.1	15.310	6	12 37 27.35	2.2073	9 33 58.4	14.683
7	10 56 36.19	2.1128	2 23 45.9	15.330	7	12 39 39.90	2.2110	9 48 37.9	14.633
8	10 58 42.97	2.1131	2 8 25.5	15.349	8	12 41 52.68	2.2148	10 3 14.4	14.583
9	11 0 49.77	2.1126	1 53 4.0	15.367	9	12 44 5.69	2.2188	10 17 47.8	14.531
10	11 2 56.60	2.1140	1 37 41.5	15.389	10	12 46 18.94	2.2226	10 32 18.1	14.478
11	11 5 3.46	2.1145	1 22 18.1	15.397	11	12 48 32.43	2.2268	10 46 45.2	14.423
12	11 7 10.35	2.1150	1 6 53.9	15.410	12	12 50 46.17	2.2310	11 1 8.9	14.367
13	11 9 17.97	2.1156	0 51 29.0	15.422	13	12 53 0.16	2.2358	11 15 29.1	14.309
14	11 11 24.22	2.1162	0 36 3.4	15.432	14	12 55 14.41	2.2396	11 29 45.8	14.247
15	11 13 31.21	2.1169	0 20 37.2	15.441	15	12 57 28.92	2.2436	11 43 58.8	14.185
16	11 15 38.24	2.1176	N. 0 5 10.5	15.449	16	12 59 43.69	2.2482	11 58 8.0	14.121
17	11 17 45.32	2.1184	S. 0 10 16.6	15.455	17	13 1 58.71	2.2526	12 12 13.3	14.056
18	11 19 52.45	2.1190	0 25 44.0	15.460	18	13 4 13.90	2.2568	12 26 14.6	13.987
19	11 21 59.64	2.1203	0 41 11.6	15.462	19	13 6 29.54	2.2613	12 40 11.8	13.918
20	11 24 6.89	2.1213	0 56 39.3	15.463	20	13 8 45.36	2.2658	12 54 4.8	13.847
21	11 26 14.21	2.1226	1 12 7.1	15.463	21	13 11 1.45	2.2704	13 7 53.5	13.775
22	11 28 21.60	2.1238	1 27 35.0	15.463	22	13 13 17.82	2.2750	13 21 37.8	13.701
23	11 30 29.08	2.1250	S. 1 43 2.8	15.463	23	13 15 34.47	2.2797	S. 13 35 17.6	13.626
THURSDAY 6.					SATURDAY 8.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	11 32 36.65	2.1269	S. 1 58 30.4	15.460	0	13 17 51.40	2.2845	S. 13 48 52.8	13.548
1	11 34 44.32	2.1285	2 13 57.8	15.456	1	13 20 8.64	2.2894	14 2 23.3	13.476
2	11 36 52.09	2.1308	2 29 24.9	15.449	2	13 22 26.15	2.2943	14 15 49.1	13.399
3	11 38 59.96	2.1330	2 44 51.6	15.441	3	13 24 43.95	2.2992	14 29 10.1	13.309
4	11 41 7.93	2.1358	3 0 17.8	15.432	4	13 27 2.05	2.3042	14 42 26.2	13.227
5	11 43 16.01	2.1385	3 15 43.4	15.421	5	13 29 20.45	2.3092	14 55 37.4	13.143
6	11 45 24.20	2.1375	3 31 8.3	15.409	6	13 31 39.14	2.3141	15 8 43.5	13.056
7	11 47 32.51	2.1385	3 46 32.4	15.395	7	13 33 58.13	2.3190	15 21 44.4	12.971
8	11 49 40.94	2.1416	4 1 55.6	15.380	8	13 36 17.41	2.3240	15 34 40.0	12.882
9	11 51 49.50	2.1438	4 17 18.0	15.365	9	13 38 37.09	2.3290	15 47 30.2	12.791
10	11 53 58.20	2.1461	4 32 39.4	15.348	10	13 40 56.88	2.3341	16 0 14.9	12.699
11	11 56 7.04	2.1485	4 47 59.7	15.329	11	13 43 17.08	2.3392	16 12 54.0	12.604
12	11 58 16.02	2.1510	5 3 18.8	15.308	12	13 45 37.59	2.3443	16 25 27.4	12.508
13	12 0 25.15	2.1536	5 18 36.6	15.285	13	13 47 58.41	2.3496	16 37 54.9	12.410
14	12 2 34.43	2.1561	5 33 53.0	15.262	14	13 50 19.54	2.3547	16 50 16.5	12.310
15	12 4 43.87	2.1588	5 49 8.0	15.238	15	13 52 40.98	2.3598	17 2 32.1	12.208
16	12 6 53.48	2.1615	6 4 21.5	15.212	16	13 55 2.73	2.3650	17 14 41.5	12.104
17	12 9 3.26	2.1643	6 19 33.4	15.184	17	13 57 24.79	2.3702	17 26 44.6	11.998
18	12 11 13.20	2.1671	6 34 43.6	15.155	18	13 59 47.16	2.3753	17 38 41.3	11.891
19	12 13 23.31	2.1699	6 49 52.0	15.124	19	14 2 9.84	2.3805	17 50 31.5	11.782
20	12 15 33.60	2.1728	7 4 58.5	15.092	20	14 4 32.83	2.3857	18 2 15.1	11.673
21	12 17 44.07	2.1756	7 20 3.0	15.058	21	14 6 56.13	2.3909	18 13 52.1	11.561
22	12 19 54.73	2.1780	7 35 5.4	15.023	22	14 9 19.75	2.3961	18 25 22.4	11.448
23	12 22 5.58	2.1804	7 50 5.6	14.985	23	14 11 43.68	2.4013	18 36 45.8	11.333
24	12 24 16.63	2.1828	S. 8 5 3.5	14.946	24	14 14 7.92	2.4065	S. 18 48 2.4	11.218



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 9.					TUESDAY 11.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	14 14 7.92	2.4065	S.18 48 2.4	11.318	0	16 14 47.44	2.5897	S.25 6 17.1	4.086
1	14 16 32.47	2.4117	18 59 12.0	11.101	1	16 17 22.86	2.5910	25 10 17.6	3.923
2	14 18 57.33	2.4168	19 10 14.5	10.983	2	16 19 58.36	2.5922	25 14 7.7	3.760
3	14 21 32.50	2.4220	19 21 9.9	10.862	3	16 22 33.93	2.5933	25 17 47.5	3.577
4	14 23 47.98	2.4272	19 31 58.0	10.740	4	16 25 9.56	2.5943	25 21 16.9	3.403
5	14 26 13.77	2.4323	19 42 38.7	10.617	5	16 27 45.24	2.5950	25 24 35.9	3.230
6	14 28 39.87	2.4375	19 53 12.0	10.493	6	16 30 20.96	2.5956	25 27 44.5	3.057
7	14 31 6.98	2.4426	20 3 37.8	10.367	7	16 32 56.71	2.5960	25 30 42.7	2.923
8	14 33 32.99	2.4477	20 13 56.0	10.239	8	16 35 32.48	2.5963	25 33 30.5	2.710
9	14 36 0.00	2.4527	20 24 6.5	10.110	9	16 38 8.26	2.5965	25 36 7.9	2.567
10	14 38 27.31	2.4577	20 34 9.2	9.979	10	16 40 44.05	2.5968	25 38 34.9	2.363
11	14 40 54.92	2.4626	20 44 4.0	9.847	11	16 43 19.83	2.5968	25 40 51.4	2.189
12	14 43 22.82	2.4675	20 53 50.8	9.713	12	16 45 55.80	2.5969	25 42 57.5	2.015
13	14 45 51.00	2.4723	21 3 29.5	9.577	13	16 48 31.35	2.5955	25 44 53.2	1.841
14	14 48 19.47	2.4770	21 13 0.0	9.439	14	16 51 7.06	2.5945	25 46 38.4	1.667
15	14 50 48.23	2.4817	21 22 22.1	9.299	15	16 53 42.73	2.5941	25 48 13.1	1.492
16	14 53 17.27	2.4863	21 31 35.8	9.158	16	16 56 18.35	2.5932	25 49 37.4	1.318
17	14 55 46.59	2.4910	21 40 41.1	9.017	17	16 58 53.91	2.5921	25 50 51.3	1.145
18	14 58 16.19	2.4956	21 49 37.9	8.875	18	17 1 29.40	2.5909	25 51 54.8	0.972
19	15 0 46.06	2.5001	21 58 26.1	8.732	19	17 4 4.81	2.5894	25 52 47.9	0.798
20	15 3 16.20	2.5045	22 7 5.6	8.587	20	17 6 40.13	2.5878	25 53 30.6	0.625
21	15 5 46.60	2.5088	22 15 36.4	8.440	21	17 9 15.35	2.5862	25 54 2.9	0.452
22	15 8 17.26	2.5132	22 23 58.4	8.292	22	17 11 50.47	2.5844	25 54 24.8	0.279
23	15 10 48.18	2.5175	S.22 32 11.5	8.143	23	17 14 25.48	2.5825	S.25 54 36.4	0.107
MONDAY 10.					WEDNESDAY 12.				
	h. m. s.	s.	° ' "	"		h. m. s.	s.	° ' "	"
0	15 13 19.35	2.5217	S.22 40 15.7	7.994	0	17 17 0.37	2.5806	S.25 54 37.7	0.084
1	15 15 50.77	2.5257	22 48 10.9	7.844	1	17 19 35.13	2.5788	25 54 28.7	0.233
2	15 18 22.43	2.5296	22 55 57.0	7.692	2	17 22 9.75	2.5769	25 54 9.5	0.466
3	15 20 54.32	2.5334	23 3 33.9	7.538	3	17 24 44.22	2.5758	25 53 40.0	0.677
4	15 23 26.43	2.5371	23 11 1.5	7.383	4	17 27 18.53	2.5756	25 53 0.3	0.747
5	15 25 58.77	2.5408	23 18 19.8	7.227	5	17 29 52.67	2.5676	25 52 10.4	0.917
6	15 28 31.33	2.5444	23 25 28.7	7.069	6	17 32 26.63	2.5645	25 51 10.3	1.086
7	15 31 4.10	2.5479	23 32 28.1	6.910	7	17 35 0.41	2.5614	25 50 0.1	1.254
8	15 33 37.08	2.5513	23 39 17.9	6.750	8	17 37 34.00	2.5592	25 48 39.9	1.421
9	15 36 10.26	2.5547	23 45 58.1	6.589	9	17 40 7.39	2.5548	25 47 9.7	1.587
10	15 38 43.64	2.5579	23 52 28.6	6.427	10	17 42 40.57	2.5512	25 45 29.5	1.752
11	15 41 17.21	2.5610	23 58 49.3	6.264	11	17 45 13.53	2.5475	25 43 39.4	1.918
12	15 43 50.96	2.5640	24 5 0.3	6.101	12	17 47 46.26	2.5437	25 41 39.4	2.082
13	15 46 24.89	2.5668	24 11 1.5	5.938	13	17 50 18.76	2.5397	25 39 29.6	2.244
14	15 48 58.98	2.5695	24 16 52.9	5.774	14	17 52 51.02	2.5357	25 37 10.1	2.405
15	15 51 33.24	2.5722	24 22 34.4	5.609	15	17 55 23.04	2.5316	25 34 41.0	2.566
16	15 54 7.65	2.5747	24 28 6.0	5.443	16	17 57 54.81	2.5273	25 32 2.2	2.727
17	15 56 42.20	2.5770	24 33 27.6	5.277	17	18 0 26.31	2.5228	25 29 13.8	2.887
18	15 59 16.89	2.5792	24 38 39.2	5.110	18	18 2 57.54	2.5182	25 26 15.8	3.047
19	16 1 51.71	2.5813	24 43 40.8	4.943	19	18 5 28.50	2.5137	25 23 8.2	3.206
20	16 4 26.65	2.5833	24 48 32.4	4.776	20	18 7 59.18	2.5090	25 19 51.1	3.364
21	16 7 1.70	2.5850	24 53 13.9	4.607	21	18 10 29.57	2.5042	25 16 24.6	3.520
22	16 9 36.85	2.5867	24 57 45.2	4.437	22	18 12 59.67	2.4992	25 13 48.8	3.675
23	16 12 12.10	2.5883	25 2 6.3	4.266	23	18 15 29.47	2.4941	25 9 3.7	3.829
24	16 14 47.44	2.5897	S.25 6 17.1	4.095	24	18 17 58.96	2.4889	S.25 5 9.4	3.981



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 13.					SATURDAY 15.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	18 17 58.96	2.4888	S.25 5 9.4	2.381	0	20 10 11.38	2.1740	S.19 23 21.0	9.737
1	18 20 28.13	2.4884	25 1 6.0	4.123	1	20 12 21.53	2.1673	19 13 34.9	9.812
2	18 22 56.97	2.4780	24 56 53.6	4.282	2	20 14 31.37	2.1606	19 3 43.7	9.906
3	18 25 25.48	2.4726	24 52 32.2	4.430	3	20 16 40.80	2.1537	18 53 47.5	9.978
4	18 27 53.66	2.4670	24 48 2.0	4.577	4	20 18 49.82	2.1470	18 43 46.4	10.038
5	18 30 21.51	2.4614	24 43 23.0	4.723	5	20 20 58.44	2.1408	18 33 40.5	10.138
6	18 32 49.02	2.4556	24 38 35.3	4.868	6	20 23 6.66	2.1337	18 23 29.8	10.217
7	18 35 16.18	2.4497	24 33 38.9	5.013	7	20 25 14.48	2.1270	18 13 14.4	10.285
8	18 37 42.99	2.4438	24 28 33.9	5.154	8	20 27 21.90	2.1204	18 2 54.4	10.373
9	18 40 9.44	2.4378	24 23 20.4	5.295	9	20 29 28.93	2.1138	17 52 29.9	10.447
10	18 42 35.53	2.4318	24 17 58.5	5.435	10	20 31 35.57	2.1073	17 42 0.9	10.530
11	18 45 1.25	2.4257	24 12 28.1	5.575	11	20 33 41.82	2.1008	17 31 27.6	10.592
12	18 47 26.60	2.4196	24 6 49.4	5.713	12	20 35 47.68	2.0944	17 20 50.0	10.662
13	18 49 51.58	2.4132	24 1 2.5	5.850	13	20 37 53.15	2.0880	17 10 8.2	10.731
14	18 52 16.18	2.4068	23 55 7.5	5.985	14	20 39 58.24	2.0817	16 59 22.3	10.799
15	18 54 40.40	2.4004	23 49 4.4	6.119	15	20 42 2.95	2.0754	16 48 32.4	10.866
16	18 57 4.23	2.3940	23 42 53.3	6.251	16	20 44 7.28	2.0691	16 37 38.5	10.931
17	18 59 27.68	2.3875	23 36 34.3	6.382	17	20 46 11.24	2.0630	16 26 40.8	10.996
18	19 1 50.73	2.3809	23 30 7.5	6.511	18	20 48 14.84	2.0569	16 15 39.2	11.068
19	19 4 13.38	2.3742	23 23 33.0	6.639	19	20 50 18.07	2.0508	16 4 33.9	11.130
20	19 6 35.63	2.3675	23 16 50.9	6.765	20	20 52 20.94	2.0448	15 53 24.9	11.180
21	19 8 57.48	2.3608	23 10 1.3	6.889	21	20 54 23.45	2.0388	15 42 12.3	11.240
22	19 11 18.93	2.3542	23 3 4.3	7.012	22	20 56 25.60	2.0329	15 30 56.2	11.298
23	19 13 39.98	2.3475	S.22 55 59.9	7.136	23	20 58 27.40	2.0270	S.15 19 36.6	11.355
FRIDAY 14.					SUNDAY 16.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	19 16 0.62	2.3407	S.22 48 48.2	7.256	0	21 0 28.85	2.0212	S.15 8 13.6	11.410
1	19 18 20.85	2.3338	22 41 29.2	7.376	1	21 2 29.95	2.0153	14 56 47.3	11.464
2	19 20 40.67	2.3270	22 34 3.1	7.494	2	21 4 30.70	2.0096	14 45 17.7	11.517
3	19 23 0.08	2.3202	22 26 30.0	7.611	3	21 6 31.10	2.0038	14 33 44.9	11.569
4	19 25 19.08	2.3133	22 18 49.9	7.726	4	21 8 31.16	1.9982	14 22 9.1	11.620
5	19 27 37.67	2.3063	22 11 2.9	7.840	5	21 10 30.89	1.9928	14 10 30.2	11.670
6	19 29 55.84	2.2993	22 3 9.1	7.952	6	21 12 30.30	1.9875	13 58 48.4	11.720
7	19 32 13.59	2.2923	21 55 8.6	8.063	7	21 14 29.39	1.9822	13 47 3.6	11.769
8	19 34 30.92	2.2853	21 47 1.5	8.172	8	21 16 28.16	1.9768	13 35 15.9	11.817
9	19 36 47.83	2.2783	21 38 47.9	8.279	9	21 18 26.61	1.9716	13 23 25.4	11.863
10	19 39 4.32	2.2713	21 30 28.0	8.385	10	21 20 24.74	1.9663	13 11 32.2	11.908
11	19 41 20.39	2.2643	21 22 1.7	8.490	11	21 22 22.58	1.9611	12 59 36.3	11.953
12	19 43 36.04	2.2573	21 13 29.1	8.594	12	21 24 20.07	1.9560	12 47 37.7	11.997
13	19 45 51.27	2.2503	21 4 50.3	8.697	13	21 26 17.28	1.9510	12 35 36.6	12.039
14	19 48 6.08	2.2433	20 56 5.4	8.798	14	21 28 14.19	1.9461	12 23 33.1	12.080
15	19 50 20.47	2.2364	20 47 14.5	8.897	15	21 30 10.81	1.9412	12 11 27.2	12.120
16	19 52 34.45	2.2295	20 38 17.8	8.994	16	21 32 7.15	1.9365	11 59 19.0	12.156
17	19 54 48.02	2.2226	20 29 15.3	9.091	17	21 34 3.20	1.9318	11 47 8.5	12.196
18	19 57 1.17	2.2157	20 20 7.0	9.186	18	21 35 58.96	1.9270	11 34 55.8	12.238
19	19 59 13.90	2.2087	20 10 53.0	9.280	19	21 37 54.44	1.9223	11 22 40.9	12.280
20	20 1 26.21	2.2017	20 1 33.4	9.373	20	21 39 49.64	1.9177	11 10 23.9	12.304
21	20 3 38.10	2.1947	19 52 8.3	9.463	21	21 41 44.56	1.9132	10 58 4.8	12.338
22	20 5 49.57	2.1877	19 42 37.8	9.553	22	21 43 39.21	1.9087	10 45 43.7	12.371
23	20 8 0.63	2.1808	19 33 2.0	9.641	23	21 45 33.60	1.9043	10 33 20.5	12.408
24	20 10 11.28	2.1740	S.19 23 21.0	9.727	24	21 47 27.73	1.9001	S.10 20 55.4	12.433



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 17.					WEDNESDAY 19.				
0	21 47 27.73	1.9001	S. 10 20 55.4	12.483	0	23 15 9.18	1.7818	S. 0 3 48.2	12.800
1	21 49 21.61	1.8990	10 8 28.5	12.463	1	23 16 56.07	1.7812	N. 0 9 11.6	12.935
2	21 51 15.25	1.8980	9 55 59.9	12.492	2	23 18 42.93	1.7807	0 22 11.1	12.989
3	21 53 8.65	1.8980	9 43 29.6	12.520	3	23 20 29.76	1.7802	0 35 10.2	12.992
4	21 55 1.81	1.8980	9 30 57.6	12.547	4	23 22 16.55	1.7797	0 48 8.9	12.975
5	21 56 54.73	1.8981	9 18 24.0	12.573	5	23 24 3.32	1.7790	1 1 7.2	12.968
6	21 58 47.42	1.8763	9 5 48.8	12.609	6	23 25 50.07	1.7790	1 14 5.1	12.961
7	22 0 39.88	1.8725	8 53 12.1	12.625	7	23 27 36.80	1.7786	1 27 2.6	12.954
8	22 2 32.12	1.8688	8 40 33.9	12.650	8	23 29 23.52	1.7786	1 39 59.6	12.945
9	22 4 24.14	1.8642	8 27 54.2	12.674	9	23 31 10.23	1.7785	1 52 56.0	12.935
10	22 6 15.94	1.8617	8 15 13.1	12.697	10	23 32 56.94	1.7785	2 5 51.8	12.921
11	22 8 7.53	1.8592	8 2 30.7	12.718	11	23 34 43.65	1.7786	2 18 46.9	12.912
12	22 9 58.92	1.8548	7 49 47.0	12.738	12	23 36 30.37	1.7786	2 31 41.3	12.900
13	22 11 50.11	1.8515	7 37 2.1	12.766	13	23 38 17.10	1.7790	2 44 34.9	12.888
14	22 13 41.10	1.8482	7 24 16.0	12.778	14	23 40 3.85	1.7793	2 57 27.8	12.875
15	22 15 31.90	1.8450	7 11 28.8	12.797	15	23 41 50.62	1.7797	3 10 19.9	12.862
16	22 17 22.51	1.8420	6 58 40.5	12.814	16	23 43 37.41	1.7801	3 23 11.2	12.848
17	22 19 12.94	1.8390	6 45 51.2	12.831	17	23 45 24.23	1.7806	3 36 1.6	12.833
18	22 21 3.19	1.8360	6 33 0.9	12.847	18	23 47 11.08	1.7812	3 48 51.1	12.818
19	22 22 53.26	1.8330	6 20 9.7	12.862	19	23 48 57.97	1.7819	4 1 39.6	12.802
20	22 24 43.16	1.8302	6 7 17.6	12.876	20	23 50 44.90	1.7826	4 14 27.1	12.786
21	22 26 32.89	1.8275	5 54 24.7	12.889	21	23 52 31.87	1.7834	4 27 13.6	12.768
22	22 28 22.46	1.8248	5 41 31.0	12.902	22	23 54 18.90	1.7843	4 39 59.0	12.750
23	22 30 11.87	1.8222	S. 5 28 36.6	12.914	23	23 56 5.98	1.7852	N. 4 52 43.3	12.731
TUESDAY 18.					THURSDAY 20.				
0	22 32 1.12	1.8197	S. 5 15 41.4	12.926	0	23 57 53.12	1.7862	N. 5 5 26.5	12.713
1	22 33 50.22	1.8172	5 2 45.5	12.937	1	23 59 40.32	1.7872	5 18 8.6	12.692
2	22 35 39.19	1.8160	4 49 49.0	12.947	2	0 1 27.59	1.7886	5 30 49.5	12.671
3	22 37 28.02	1.8127	4 36 51.9	12.967	3	0 3 14.93	1.7895	5 43 29.1	12.650
4	22 39 16.72	1.8106	4 23 54.2	12.966	4	0 5 2.34	1.7908	5 56 7.4	12.628
5	22 41 5.29	1.8084	4 10 56.0	12.975	5	0 6 49.83	1.7922	6 8 44.4	12.606
6	22 42 53.73	1.8063	3 57 57.3	12.982	6	0 8 37.40	1.7937	6 21 20.1	12.583
7	22 44 42.05	1.8043	3 44 58.2	12.989	7	0 10 25.06	1.7952	6 33 54.4	12.560
8	22 46 30.25	1.8023	3 31 58.7	12.995	8	0 12 12.82	1.7968	6 46 27.3	12.537
9	22 48 18.34	1.8006	3 18 58.9	13.000	9	0 14 0.68	1.7986	6 58 58.7	12.512
10	22 50 6.32	1.7988	3 5 58.8	13.004	10	0 15 48.64	1.8002	7 11 28.6	12.486
11	22 51 54.20	1.7971	2 52 58.5	13.007	11	0 17 36.71	1.8020	7 23 56.9	12.460
12	22 53 41.98	1.7955	2 39 58.0	13.010	12	0 19 24.89	1.8038	7 36 23.7	12.434
13	22 55 29.66	1.7939	2 26 57.3	13.013	13	0 21 13.18	1.8057	7 48 48.9	12.407
14	22 57 17.25	1.7924	2 13 56.4	13.018	14	0 23 1.58	1.8077	8 1 12.4	12.379
15	22 59 4.75	1.7910	2 0 55.3	13.017	15	0 24 50.10	1.8097	8 13 34.3	12.346
16	23 0 52.17	1.7897	1 47 54.2	13.018	16	0 26 38.74	1.8118	8 25 54.2	12.316
17	23 2 39.51	1.7885	1 34 53.1	13.018	17	0 28 27.51	1.8140	8 38 12.4	12.288
18	23 4 26.79	1.7874	1 21 52.0	13.018	18	0 30 16.42	1.8163	8 50 28.8	12.260
19	23 6 14.00	1.7863	1 8 51.0	13.017	19	0 32 5.47	1.8187	9 2 43.3	12.227
20	23 8 1.15	1.7853	0 55 50.1	13.016	20	0 33 54.66	1.8211	9 14 56.0	12.196
21	23 9 48.24	1.7843	0 42 49.3	13.012	21	0 35 44.00	1.8236	9 27 6.8	12.168
22	23 11 35.27	1.7833	0 29 48.7	13.008	22	0 37 33.49	1.8261	9 39 15.7	12.139
23	23 13 22.25	1.7825	0 16 48.3	13.004	23	0 39 23.13	1.8287	9 51 22.5	12.096
24	23 15 9.18	1.7818	S. 0 3 48.2	13.000	24	0 41 12.93	1.8313	N. 10 3 27.3	12.068



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 21.					SUNDAY 23.				
0	0 41 12.93	1.8818	N.10 3 27.3	12.062	0	2 13 21.86	2.0302	N.18 47 58.6	9.473
1	0 43 2.89	1.8840	10 15 29.9	12.027	1	2 15 23.78	2.0347	18 57 24.7	9.397
2	0 44 53.02	1.8868	10 27 30.4	11.991	2	2 17 26.02	2.0400	19 6 46.2	9.320
3	0 46 43.32	1.8897	10 39 28.7	11.954	3	2 19 28.59	2.0454	19 16 3.1	9.242
4	0 48 33.79	1.8937	10 51 24.8	11.916	4	2 21 31.49	2.0509	19 25 15.3	9.163
5	0 50 24.44	1.8987	11 3 18.6	11.877	5	2 23 34.71	2.0563	19 34 22.7	9.083
6	0 52 15.27	1.8987	11 15 10.0	11.837	6	2 25 38.26	2.0618	19 43 25.2	9.002
7	0 54 6.29	1.8918	11 26 59.1	11.798	7	2 27 42.14	2.0673	19 52 22.8	8.920
8	0 55 57.49	1.8950	11 38 45.8	11.758	8	2 29 46.35	2.0728	20 1 15.5	8.836
9	0 57 48.88	1.8982	11 50 30.1	11.717	9	2 31 50.89	2.0784	20 10 3.2	8.751
10	0 59 40.47	1.8916	12 2 11.9	11.676	10	2 33 55.76	2.0840	20 18 45.7	8.666
11	1 1 32.26	1.8848	12 13 51.2	11.633	11	2 36 0.97	2.0896	20 27 23.1	8.580
12	1 3 24.26	1.8882	12 25 27.9	11.590	12	2 38 6.52	2.0953	20 35 55.3	8.494
13	1 5 16.47	1.8718	12 37 2.0	11.546	13	2 40 12.41	2.1010	20 44 22.3	8.406
14	1 7 8.89	1.8744	12 48 33.5	11.502	14	2 42 18.64	2.1067	20 52 44.0	8.317
15	1 9 1.53	1.8791	13 0 2.3	11.457	15	2 44 25.21	2.1123	21 1 0.3	8.227
16	1 10 54.39	1.8836	13 11 28.3	11.410	16	2 46 32.12	2.1180	21 9 11.2	8.136
17	1 12 47.47	1.8886	13 22 51.5	11.362	17	2 48 39.37	2.1237	21 17 16.6	8.044
18	1 14 40.78	1.8903	13 34 11.7	11.313	18	2 50 46.96	2.1294	21 25 16.4	7.950
19	1 16 34.32	1.8941	13 45 29.0	11.263	19	2 52 54.89	2.1351	21 33 10.5	7.856
20	1 18 28.09	1.8980	13 56 43.3	11.213	20	2 55 3.17	2.1408	21 40 58.9	7.760
21	1 20 22.09	1.9020	14 7 54.6	11.162	21	2 57 11.79	2.1465	21 48 41.5	7.662
22	1 22 16.33	1.9060	14 19 2.8	11.111	22	2 59 20.75	2.1522	21 56 18.3	7.565
23	1 24 10.82	1.9108	N.14 30 7.9	11.068	23	3 1 30.06	2.1580	N.22 3 49.2	7.467
SATURDAY 22.					MONDAY 24.				
0	1 26 5.56	1.9145	N.14 41 9.8	11.025	0	3 3 39.72	2.1638	N.22 11 14.2	7.367
1	1 28 0.56	1.9187	14 52 8.5	10.982	1	3 5 49.73	2.1696	22 18 33.2	7.266
2	1 29 55.81	1.9220	15 3 3.9	10.938	2	3 8 0.08	2.1753	22 25 46.1	7.164
3	1 31 51.32	1.9273	15 13 50.1	10.843	3	3 10 10.77	2.1810	22 32 52.7	7.060
4	1 33 47.09	1.9317	15 24 45.0	10.787	4	3 12 21.80	2.1867	22 39 53.1	6.955
5	1 35 43.12	1.9361	15 35 30.5	10.730	5	3 14 33.17	2.1924	22 46 47.2	6.849
6	1 37 39.42	1.9405	15 46 12.6	10.673	6	3 16 44.88	2.1981	22 53 34.9	6.742
7	1 39 35.99	1.9450	15 56 51.2	10.615	7	3 18 56.94	2.2038	23 0 16.2	6.634
8	1 41 32.83	1.9496	16 7 26.3	10.556	8	3 21 9.34	2.2095	23 6 51.0	6.525
9	1 43 29.95	1.9542	16 17 57.9	10.496	9	3 23 22.08	2.2152	23 13 19.2	6.415
10	1 45 27.34	1.9588	16 28 25.8	10.435	10	3 25 35.16	2.2209	23 19 40.8	6.306
11	1 47 25.01	1.9636	16 38 50.0	10.372	11	3 27 48.58	2.2266	23 25 55.7	6.193
12	1 49 22.97	1.9685	16 49 10.4	10.308	12	3 30 2.34	2.2322	23 32 3.9	6.080
13	1 51 21.23	1.9734	16 59 26.9	10.243	13	3 32 16.44	2.2377	23 38 5.3	5.966
14	1 53 19.78	1.9783	17 9 39.5	10.178	14	3 34 30.87	2.2432	23 43 59.8	5.850
15	1 55 18.63	1.9833	17 19 48.2	10.112	15	3 36 45.62	2.2486	23 49 47.3	5.733
16	1 57 17.78	1.9883	17 29 52.9	10.044	16	3 39 0.70	2.2540	23 55 27.8	5.616
17	1 59 17.23	1.9933	17 39 53.5	9.975	17	3 41 16.11	2.2595	24 1 1.3	5.497
18	2 1 16.98	1.9983	17 49 49.9	9.905	18	3 43 31.85	2.2650	24 6 27.6	5.378
19	2 3 17.03	2.0033	17 59 42.0	9.834	19	3 45 47.91	2.2704	24 11 46.7	5.256
20	2 5 17.38	2.0083	18 9 29.9	9.763	20	3 48 4.30	2.2758	24 16 58.5	5.137
21	2 7 18.04	2.0134	18 19 13.6	9.692	21	3 50 21.01	2.2812	24 22 3.0	5.014
22	2 9 19.00	2.0185	18 28 53.0	9.620	22	3 52 38.04	2.2865	24 27 0.1	4.891
23	2 11 20.27	2.0236	18 38 28.0	9.547	23	3 54 55.39	2.2917	24 31 49.8	4.766
24	2 13 21.86	2.0292	N.18 47 58.6	9.473	24	3 57 13.05	2.2969	N.24 36 32.0	4.640



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 25.					THURSDAY 27.				
0	h. m. s.	2.3969	N. 24 36 32.0	4.640	0	h. m. s.	2.4496	N. 25 38 18.9	2.308
1	3 57 13.05	2.3970	24 41 6.6	4.513	1	5 54 26.99	2.4505	25 35 55.8	2.462
2	4 1 40.29	2.3970	24 45 33.6	4.385	2	5 56 54.04	2.4511	25 33 23.4	2.617
3	4 4 7.86	2.3120	24 49 59.9	4.256	3	5 59 21.12	2.4515	25 30 41.7	2.773
4	4 6 26.73	2.3170	24 54 4.4	4.127	4	6 1 48.22	2.4518	25 27 50.6	2.928
5	4 8 45.89	2.3218	24 58 8.1	3.997	5	6 4 15.34	2.4520	25 24 50.2	3.083
6	4 11 5.34	2.3265	25 2 3.9	3.865	6	6 6 42.46	2.4520	25 21 40.5	3.238
7	4 13 25.07	2.3312	25 5 51.8	3.732	7	6 9 9.58	2.4520	25 18 21.5	3.393
8	4 15 45.08	2.3358	25 9 31.8	3.600	8	6 11 36.69	2.4518	25 14 53.9	3.548
9	4 18 5.37	2.3405	25 13 3.7	3.468	9	6 14 3.79	2.4516	25 11 15.6	3.703
10	4 20 25.94	2.3451	25 16 27.5	3.336	10	6 16 30.87	2.4512	25 7 28.7	3.858
11	4 22 46.78	2.3496	25 19 43.1	3.192	11	6 18 57.93	2.4508	25 3 32.5	4.013
12	4 25 7.89	2.3540	25 23 50.5	3.048	12	6 21 24.96	2.4502	24 59 27.0	4.168
13	4 27 29.26	2.3583	25 25 49.7	2.918	13	6 23 51.95	2.4495	24 55 12.3	4.323
14	4 29 50.89	2.3626	25 28 40.6	2.780	14	6 26 18.90	2.4488	24 50 48.4	4.476
15	4 32 12.78	2.3668	25 31 23.2	2.640	15	6 28 45.80	2.4480	24 46 15.2	4.630
16	4 34 34.92	2.3709	25 33 57.3	2.499	16	6 31 12.65	2.4470	24 41 32.8	4.783
17	4 36 57.30	2.3749	25 36 23.0	2.358	17	6 33 39.44	2.4459	24 36 41.2	4.936
18	4 39 19.91	2.3788	25 38 40.2	2.216	18	6 36 6.16	2.4447	24 31 40.4	5.088
19	4 41 42.75	2.3826	25 40 48.9	2.073	19	6 38 32.80	2.4433	24 26 30.6	5.240
20	4 44 5.82	2.3863	25 42 49.0	1.930	20	6 40 59.36	2.4418	24 21 11.7	5.391
21	4 46 29.11	2.3899	25 44 40.5	1.786	21	6 43 25.82	2.4402	24 15 43.7	5.543
22	4 48 52.61	2.3935	25 46 23.3	1.641	22	6 45 52.19	2.4386	24 10 6.6	5.695
23	4 51 16.32	2.3970	N. 25 47 57.4	1.496	23	6 48 18.46	2.4370	N. 24 4 20.5	5.848
WEDNESDAY 26.					FRIDAY 28.				
0	4 53 40.24	2.4004	N. 25 49 22.7	1.349	0	6 50 44.63	2.4353	N. 23 58 25.4	5.693
1	4 56 4.36	2.4037	25 50 39.2	1.302	1	6 53 10.70	2.4335	23 52 21.4	5.843
2	4 58 28.67	2.4068	25 51 46.9	1.054	2	6 55 36.65	2.4315	23 46 8.5	6.090
3	5 0 53.17	2.4098	25 52 45.8	0.906	3	6 58 2.48	2.4295	23 39 46.7	6.337
4	5 3 17.85	2.4128	25 53 35.8	0.757	4	7 0 28.18	2.4273	23 33 16.1	6.583
5	5 5 42.71	2.4158	25 54 16.7	0.607	5	7 2 53.75	2.4250	23 26 36.8	6.729
6	5 8 7.75	2.4187	25 54 48.6	0.457	6	7 5 19.18	2.4227	23 19 48.7	6.875
7	5 10 32.96	2.4215	25 55 11.5	0.307	7	7 7 44.47	2.4204	23 12 51.9	7.020
8	5 12 58.33	2.4241	25 55 25.4	0.156	8	7 10 9.62	2.4180	23 5 46.4	7.164
9	5 15 23.85	2.4265	25 55 30.2	0.005	9	7 12 34.62	2.4155	22 58 32.3	7.307
10	5 17 49.51	2.4287	25 55 25.9	0.147	10	7 14 59.47	2.4129	22 51 9.6	7.450
11	5 20 15.29	2.4308	25 55 12.5	0.300	11	7 17 24.16	2.4102	22 43 38.3	7.592
12	5 22 41.20	2.4328	25 54 49.9	0.453	12	7 19 48.69	2.4074	22 35 58.5	7.733
13	5 25 7.23	2.4348	25 54 18.1	0.607	13	7 22 13.04	2.4045	22 28 10.3	7.872
14	5 27 33.38	2.4367	25 53 37.1	0.760	14	7 24 37.22	2.4016	22 20 13.8	8.009
15	5 29 59.65	2.4386	25 53 46.9	0.913	15	7 27 1.23	2.3987	22 12 9.1	8.145
16	5 32 26.02	2.4403	25 51 47.5	1.067	16	7 29 25.06	2.3957	22 3 56.2	8.282
17	5 34 52.49	2.4420	25 50 38.9	1.220	17	7 31 48.71	2.3927	21 55 35.1	8.419
18	5 37 19.05	2.4435	25 49 21.1	1.374	18	7 34 12.18	2.3896	21 47 5.8	8.555
19	5 39 45.70	2.4448	25 47 54.0	1.528	19	7 36 35.46	2.3864	21 38 28.4	8.690
20	5 42 12.43	2.4461	25 46 17.6	1.683	20	7 38 58.55	2.3831	21 29 43.0	8.824
21	5 44 39.23	2.4472	25 44 31.9	1.838	21	7 41 21.44	2.3798	21 20 49.6	8.957
22	5 47 6.09	2.4482	25 42 36.9	1.992	22	7 43 44.13	2.3765	21 11 48.3	9.088
23	5 49 33.01	2.4491	25 40 32.6	2.146	23	7 46 6.62	2.3732	21 2 39.1	9.218
24	5 51 59.98	2.4499	N. 25 38 18.9	2.300	24	7 48 28.91	2.3698	N. 20 53 22.1	9.347



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 29.					MONDAY 31.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	7 48 28.91	2.3668	N.20 53 22.1	9.347	0	9 37 59.93	2.1973	N.11 19 40.9	14.043
1	7 50 50.99	2.3663	20 43 57.4	9.476	1	9 40 11.67	2.1942	11 5 36.4	14.107
2	7 53 12.86	2.3628	20 34 25.0	9.608	2	9 42 23.23	2.1912	10 51 28.1	14.169
3	7 55 34.52	2.3593	20 24 45.0	9.728	3	9 44 34.61	2.1882	10 37 16.1	14.230
4	7 57 55.97	2.3558	20 14 57.6	9.862	4	9 46 45.81	2.1868	10 23 0.5	14.290
5	8 0 17.21	2.3522	20 5 2.8	9.976	5	9 48 56.85	2.1885	10 8 41.4	14.348
6	8 2 38.23	2.3485	19 55 0.7	10.097	6	9 51 7.72	2.1797	9 54 18.8	14.404
7	8 4 59.03	2.3448	19 44 51.3	10.217	7	9 53 18.42	2.1770	9 39 52.9	14.459
8	8 7 19.61	2.3411	19 34 34.7	10.337	8	9 55 28.96	2.1743	9 25 23.8	14.512
9	8 9 39.97	2.3374	19 24 11.0	10.455	9	9 57 39.34	2.1717	9 10 51.6	14.563
10	8 12 0.10	2.3337	19 13 40.2	10.573	10	9 59 49.57	2.1692	8 56 16.3	14.613
11	8 14 20.01	2.3300	19 3 2.4	10.688	11	10 1 59.65	2.1668	8 41 38.0	14.662
12	8 16 39.70	2.3263	18 52 17.7	10.803	12	10 4 9.59	2.1645	8 26 56.8	14.710
13	8 18 59.17	2.3226	18 41 26.1	10.917	13	10 6 19.39	2.1622	8 12 12.8	14.757
14	8 21 18.41	2.3189	18 30 27.7	11.030	14	10 8 29.05	2.1609	7 57 26.1	14.802
15	8 23 37.42	2.3150	18 19 22.6	11.142	15	10 10 38.58	2.1577	7 42 36.7	14.845
16	8 25 56.20	2.3112	18 8 10.8	11.262	16	10 12 47.98	2.1555	7 27 44.7	14.887
17	8 28 14.75	2.3073	17 56 52.4	11.380	17	10 14 57.25	2.1534	7 12 50.2	14.929
18	8 30 33.07	2.3035	17 45 27.5	11.467	18	10 17 6.39	2.1513	6 57 53.2	14.970
19	8 32 51.16	2.2997	17 33 56.3	11.573	19	10 19 15.41	2.1493	6 42 53.8	15.009
20	8 35 9.02	2.2958	17 22 18.8	11.677	20	10 21 24.31	2.1474	6 27 52.1	15.047
21	8 37 26.65	2.2920	17 10 35.1	11.780	21	10 23 33.10	2.1456	6 12 48.2	15.083
22	8 39 44.05	2.2882	16 58 45.3	11.882	22	10 25 41.79	2.1439	5 57 42.2	15.117
23	8 42 1.22	2.2844	N.16 46 49.4	11.982	23	10 27 50.38	2.1423	N. 5 42 34.3	15.148
SUNDAY 30.					TUESDAY, JANUARY 1, 1861.				
	<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>
0	8 44 18.17	2.2806	N.16 34 47.5	12.082	0	10 29 58.87	2.1407	N. 5 27 24.5	15.178
1	8 46 34.89	2.2768	16 22 39.7	12.180					
2	8 48 51.38	2.2730	16 10 26.0	12.277					
3	8 51 7.65	2.2692	15 58 6.6	12.372					
4	8 53 23.70	2.2657	15 45 41.5	12.466					
5	8 55 39.53	2.2620	15 33 10.8	12.558					
6	8 57 55.14	2.2583	15 20 34.6	12.648					
7	9 0 10.53	2.2547	15 7 53.0	12.737					
8	9 2 25.70	2.2510	14 55 6.1	12.825					
9	9 4 40.65	2.2473	14 42 14.0	12.912					
10	9 6 55.38	2.2437	14 29 16.8	12.997					
11	9 9 9.89	2.2400	14 16 14.5	13.081					
12	9 11 24.18	2.2364	14 3 7.2	13.163					
13	9 13 38.26	2.2329	13 49 55.0	13.243					
14	9 15 52.13	2.2293	13 36 38.0	13.323					
15	9 18 5.80	2.2262	13 23 16.3	13.402					
16	9 20 19.27	2.2228	13 9 49.9	13.479					
17	9 22 32.54	2.2194	12 56 18.9	13.554					
18	9 24 45.60	2.2160	12 42 43.4	13.628					
19	9 26 58.46	2.2127	12 29 3.5	13.701					
20	9 29 11.13	2.2093	12 15 19.2	13.773					
21	9 31 23.61	2.2064	12 1 30.7	13.843					
22	9 33 35.90	2.2033	11 47 38.1	13.911					
23	9 35 48.01	2.2003	11 33 41.5	13.978					
24	9 37 59.93	2.1973	N.11 19 40.9	14.043					

## PHASES OF THE MOON.

	Day.	h.	m.
☾ Last Quarter, . . .	5	6	0.8
● New Moon, . . .	12	0	48.5
☾ First Quarter, . . .	19	18	9.8
○ Full Moon, . . .	27	15	17.4

	Day.	h.
☾ Perigee, . . . . .	8	8.0
☾ Apogee, . . . . .	20	7.6



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of ME.	IIIh.	P. L. of ME.	VIh.	P. L. of ME.	IXh.	P. L. of ME.
1	$\alpha$ Arietis W.	70 12 13	2864	71 51 58	2856	73 31 54	2848	75 12 0	2840
	Aldebaran W.	38 20 3	2869	39 56 58	2873	41 34 16	2865	43 11 57	2860
	Jupiter E.	41 4 27	2880	39 25 4	2873	37 45 32	2868	36 5 53	2861
	Regulus E.	42 9 26	2868	40 29 40	2867	38 49 46	2861	37 9 44	2855
	Saturn E.	53 28 31	2867	51 49 18	2860	50 9 56	2875	48 30 27	2869
	Spica E.	96 10 45	2863	94 30 45	2846	92 50 34	2838	91 10 13	2830
2	$\alpha$ Arietis W.	83 35 12	2862	85 16 22	2486	86 57 41	2480	88 39 10	2482
	Aldebaran W.	51 25 1	2877	53 4 28	2866	54 44 10	2855	56 24 7	2845
	Saturn E.	40 11 5	2844	38 30 53	2841	36 50 37	2838	35 10 16	2836
	Spica E.	82 45 51	2486	81 4 28	2487	79 22 56	2480	77 41 14	2473
	Venus E.	93 38 4	2881	92 6 24	2824	90 34 35	2815	89 2 35	2808
	SUN E.	131 28 25	2840	129 54 49	2882	128 21 3	2825	126 47 7	2815
3	$\alpha$ Arietis W.	97 9 2	2448	98 51 29	2441	100 34 5	2434	102 16 51	2428
	Aldebaran W.	64 47 14	2486	66 28 30	2490	68 9 57	2483	69 51 36	2474
	Spica E.	69 10 19	2489	67 27 40	2432	65 44 51	2426	64 1 53	2419
	Venus E.	81 20 14	2870	79 47 17	2864	78 14 12	2858	76 40 59	2850
	SUN E.	118 54 43	2776	117 19 43	2769	115 44 34	2760	114 9 14	2758
4	Aldebaran W.	78 22 33	2436	80 5 17	2429	81 48 10	2423	83 31 12	2417
	Pollux W.	36 20 7	2458	38 2 24	2443	39 44 57	2431	41 27 47	2422
	Spica E.	55 24 49	2880	53 40 68	2888	51 56 59	2877	50 12 51	2871
	Venus E.	68 52 40	2818	67 18 35	2813	65 44 23	2806	64 10 3	2799
	SUN E.	106 10 12	2716	104 33 54	2710	102 57 28	2703	101 20 52	2696
5	Aldebaran W.	92 8 39	2866	93 52 35	2860	95 36 38	2875	97 20 49	2869
	Pollux W.	50 5 26	2878	51 49 37	2867	53 23 50	2860	55 18 32	2853
	Spica E.	41 30 11	2844	39 45 16	2839	38 0 14	2836	36 15 7	2831
	Venus E.	56 16 31	2773	54 41 28	2769	53 6 19	2765	51 31 5	2762
	SUN E.	93 15 35	2663	91 38 5	2667	90 0 27	2649	88 22 39	2644
6	Pollux W.	64 3 54	2818	65 49 27	2812	67 35 9	2807	69 20 59	2801
	Jupiter W.	28 2 9	2830	29 47 25	2821	31 32 54	2812	33 18 36	2804
	Regulus W.	27 2 7	2820	28 47 38	2811	30 33 22	2802	32 19 18	2796
	Venus E.	43 33 48	2747	41 58 11	2747	40 22 33	2746	38 46 54	2747
	SUN E.	80 11 38	2614	78 33 2	2608	76 54 18	2604	75 15 28	2609
7	Pollux W.	78 12 4	2277	79 58 37	2278	81 45 16	2269	83 32 1	2266
	Jupiter W.	42 9 40	2273	43 56 19	2268	45 43 6	2264	47 29 59	2260
	Regulus W.	41 11 26	2266	42 58 16	2260	44 45 14	2256	46 32 18	2252
	Saturn W.	30 6 11	2228	31 51 30	2217	33 37 4	2209	35 22 51	2200
	SUN E.	66 59 35	2678	65 20 6	2671	63 40 31	2668	62 0 52	2665
8	Pollux W.	92 26 51	2238	94 13 59	2232	96 1 9	2221	97 48 21	2220
	Jupiter W.	56 25 52	2243	58 13 15	2241	60 0 42	2239	61 48 12	2237
	Regulus W.	55 29 0	2237	57 16 32	2235	59 4 8	2233	60 51 46	2231
	Saturn W.	44 14 28	2270	46 1 11	2266	47 48 1	2263	49 34 55	2261
	SUN E.	53 41 38	2658	52 1 38	2662	50 21 37	2651	48 41 34	2650
9	Jupiter W.	70 46 1	2226	72 33 35	2227	74 21 7	2239	76 8 37	2240
	Regulus W.	69 50 14	2232	71 37 54	2232	73 25 34	2234	75 13 11	2236
	Saturn W.	58 30 9	2235	60 17 15	2235	62 4 21	2236	63 51 26	2237
	SUN E.	40 21 19	2654	38 41 21	2656	37 1 26	2659	35 21 35	2652



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
1	$\alpha$ Arietis W.	76 52 18	2638	78 32 46	2625	80 13 25	2618	81 54 13	2610
	Aldebaran W.	44 49 57	2626	46 28 17	2612	48 6 55	2600	49 45 50	2588
	Jupiter E.	34 26 5	2566	32 46 10	2553	31 6 9	2548	29 26 3	2545
	Regulus E.	35 29 34	2639	33 49 15	2634	32 8 49	2629	30 28 16	2626
	Saturn E.	46 50 49	2663	45 11 3	2558	43 31 10	2553	41 51 10	2548
	Spica E.	89 29 41	2623	87 48 59	2615	86 8 6	2607	84 27 3	2600
2	$\alpha$ Arietis W.	90 20 49	2674	92 2 39	2667	93 44 38	2661	95 26 46	2655
	Aldebaran W.	58 4 18	2635	59 44 42	2626	61 25 20	2616	63 6 11	2607
	Saturn E.	33 29 53	2634	31 49 27	2635	30 9 2	2635	28 28 37	2638
	Spica E.	75 59 22	2665	74 17 20	2669	72 35 9	2658	70 52 49	2646
	Venus E.	87 30 26	2600	85 58 7	2593	84 25 39	2585	82 53 1	2578
	SUN E.	125 12 59	2607	123 38 40	2600	122 4 12	2592	120 29 33	2583
3	$\alpha$ Arietis W.	103 59 46	2622	105 42 50	2615	107 26 4	2608	109 9 27	2608
	Aldebaran W.	71 33 26	2605	73 15 27	2606	74 57 39	2601	76 40 1	2604
	Spica E.	62 18 46	2613	60 35 30	2607	58 52 5	2601	57 8 31	2595
	Venus E.	75 7 36	2644	73 34 5	2636	72 0 25	2631	70 26 37	2624
	SUN E.	112 33 45	2747	110 58 7	2739	109 22 19	2732	107 46 21	2723
4	Aldebaran W.	85 14 23	2610	86 57 43	2608	88 41 13	2607	90 24 52	2591
	Pollux W.	43 10 51	2611	44 54 10	2601	46 37 43	2592	48 21 29	2584
	Spica E.	48 28 34	2606	46 44 10	2590	44 59 38	2585	43 14 59	2549
	Venus E.	62 35 34	2795	61 0 59	2788	59 26 15	2784	57 51 27	2779
	SUN E.	99 44 7	2699	98 7 13	2693	96 30 10	2675	94 52 57	2669
5	Aldebaran W.	99 5 8	2664	100 49 34	2669	102 34 7	2655	104 18 47	2650
	Pollux W.	57 3 15	2644	58 48 10	2637	60 33 15	2631	62 18 30	2624
	Spica E.	34 29 53	2628	32 44 34	2624	30 59 9	2622	29 13 41	2620
	Venus E.	49 55 47	2767	48 20 23	2764	46 44 55	2761	45 9 23	2749
	SUN E.	86 44 44	2686	85 6 40	2680	83 28 26	2676	81 50 6	2670
6	Pollux W.	71 6 57	2695	72 53 3	2691	74 39 16	2686	76 25 37	2681
	Jupiter W.	35 4 29	2697	36 50 33	2691	38 36 46	2684	40 23 9	2679
	Regulus W.	34 5 25	2698	35 51 42	2692	37 38 8	2676	39 24 43	2670
	Venus E.	37 11 16	2748	35 35 40	2751	34 0 8	2755	32 24 41	2761
	SUN E.	73 36 30	2693	71 57 26	2686	70 18 15	2684	68 38 58	2680
7	Pollux W.	85 18 51	2683	87 5 45	2680	88 52 44	2668	90 39 46	2656
	Jupiter W.	49 16 59	2686	51 4 4	2681	52 51 16	2648	54 38 32	2645
	Regulus W.	48 19 28	2649	50 6 43	2645	51 54 4	2641	53 41 30	2638
	Saturn W.	37 8 50	2692	38 55 1	2685	40 41 22	2680	42 27 51	2674
	SUN E.	00 21 9	2692	58 41 22	2689	57 1 30	2687	55 21 36	2684
8	Pollux W.	99 35 34	2680	101 22 47	2680	103 10 0	2651	104 57 12	2652
	Jupiter W.	63 35 44	2637	65 23 16	2637	67 10 51	2627	68 58 26	2627
	Regulus W.	62 39 26	2631	64 27 7	2630	66 14 50	2621	68 2 31	2620
	Saturn W.	51 21 52	2636	53 8 53	2635	54 55 57	2626	56 43 2	2624
	SUN E.	47 1 30	2650	45 21 26	2650	43 41 22	2651	42 1 20	2652
9	Jupiter W.	77 56 5	2643	79 43 29	2645	81 30 49	2648	83 18 5	2651
	Regulus W.	77 0 45	2639	78 48 15	2641	80 35 42	2645	82 23 3	2647
	Saturn W.	65 38 29	2639	67 25 29	2631	69 12 26	2624	70 59 19	2627
	SUN E.	33 41 48	2666	32 2 7	2673	30 22 33	2677	28 43 7	2683



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
14	SUN	W.	24 40 21	2956	26 11 29	2969	27 42 19	2963	29 12 54	2997
	Mars	E.	58 0 32	2933	56 26 47	2949	54 53 23	2966	53 20 21	2993
	α Pegasi	E.	65 50 30	2766	64 15 17	2785	62 40 30	2906	61 6 9	2936
	α Arietis	E.	108 3 55	2999	106 24 59	2614	104 46 23	2938	103 8 6	2943
15	SUN	W.	36 41 12	3072	38 9 56	3097	39 38 22	3102	41 6 29	3119
	Mars	E.	45 40 37	2970	44 9 47	2986	42 39 17	3006	41 9 11	3022
	α Pegasi	E.	53 21 33	2943	51 50 9	2969	50 19 17	2996	48 48 59	3024
	α Arietis	E.	95 1 45	2718	93 25 29	2732	91 49 32	2747	90 13 55	2763
16	SUN	W.	48 22 26	3198	49 48 44	3207	51 14 45	3221	52 40 29	3236
	Mars	E.	33 44 13	3115	32 16 22	3133	30 48 53	3156	29 21 50	3173
	α Pegasi	E.	41 26 39	3186	40 0 13	3224	38 34 33	3256	37 9 41	3309
	α Arietis	E.	82 20 35	2933	80 46 50	2847	79 13 23	2861	77 40 14	2875
17	SUN	W.	59 45 6	3801	61 9 16	3814	62 33 11	3825	63 56 53	3837
	α Arietis	E.	69 58 42	2939	68 27 12	2949	66 55 55	2992	65 24 54	2971
	Aldebaran	E.	102 29 39	2978	100 58 59	2969	99 28 33	3000	97 58 20	3009
18	SUN	W.	70 52 15	3887	72 14 46	3896	73 37 7	3405	74 59 18	3414
	α Aquilæ	W.	44 5 25	4851	45 11 31	4298	46 18 35	4284	47 26 29	4168
	α Arietis	E.	57 53 4	3022	56 23 19	3031	54 53 45	3039	53 24 21	3048
	Aldebaran	E.	90 30 17	3066	89 1 14	3066	87 32 22	3073	86 3 39	3079
19	SUN	W.	81 48 8	3446	83 9 33	3450	84 30 53	3454	85 52 9	3467
	α Aquilæ	W.	53 16 44	3999	54 28 34	3960	55 40 53	3933	56 53 39	3906
	α Arietis	E.	45 59 48	3084	44 31 19	3091	43 2 58	3096	41 34 44	3101
	Aldebaran	E.	78 42 10	3113	77 14 15	3116	75 46 25	3122	74 18 42	3125
20	SUN	W.	92 37 38	3468	93 58 38	3469	95 19 37	3469	96 40 36	3468
	α Aquilæ	W.	63 3 29	3802	64 18 29	3785	65 33 47	3768	66 49 22	3732
	Fomalhaut	W.	38 59 57	4254	40 7 32	4185	41 16 12	4120	42 25 54	4093
	α Arietis	E.	34 15 11	3128	32 47 35	3132	31 20 5	3138	29 52 40	3142
21	SUN	W.	103 25 55	3456	104 47 8	3453	106 8 25	3449	107 29 46	3444
	α Aquilæ	W.	73 11 13	3683	74 28 18	3671	75 45 36	3660	77 3 6	3648
	Fomalhaut	W.	48 27 19	3632	49 41 48	3796	50 56 54	3762	52 12 36	3729
	Mars	W.	23 52 26	3417	25 14 23	3406	26 36 33	3394	27 58 56	3384
22	Aldebaran	E.	55 23 32	3150	53 56 22	3150	52 29 12	3150	51 2 3	3148
	Pollux	E.	97 11 58	3683	95 43 40	3670	94 15 18	3660	92 46 51	3648
	SUN	W.	114 18 7	3413	115 40 9	3405	117 2 20	3396	118 24 41	3388
	α Aquilæ	W.	83 33 40	3594	84 52 21	3585	86 11 12	3576	87 30 13	3566
23	Fomalhaut	W.	58 39 3	3592	59 57 46	3667	61 16 56	3645	62 36 31	3623
	Mars	W.	34 53 58	3329	36 17 36	3318	37 41 27	3306	39 5 31	3296
	Aldebaran	E.	43 46 2	3148	42 18 50	3147	40 51 37	3146	39 24 23	3148
	Pollux	E.	85 23 1	3692	83 53 53	3646	82 24 37	3639	80 55 12	3631
23	SUN	W.	125 18 59	3339	126 42 25	3329	128 6 3	3317	129 29 55	3306
	Fomalhaut	W.	69 20 17	3422	70 42 9	3403	72 4 22	3385	73 26 56	3368
	α Pegasi	W.	46 53 51	3328	48 19 15	3316	49 45 5	3303	51 11 21	3292
	Mars	W.	46 8 59	3340	47 34 21	3328	48 59 57	3317	50 25 46	3304
	Pollux	E.	73 25 38	2988	71 55 10	2979	70 24 31	2969	68 53 40	2969
	Jupiter	E.	109 13 31	2956	107 42 23	2945	106 11 1	2935	104 39 26	2924



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
			<sup>o</sup> <sup>i</sup> <sup>"</sup>		<sup>o</sup> <sup>i</sup> <sup>"</sup>		<sup>o</sup> <sup>i</sup> <sup>"</sup>		<sup>o</sup> <sup>i</sup> <sup>"</sup>	
14	SUN	W.	30 43 11	3012	32 13 9	3027	33 42 48	3042	35 12 9	3056
	Mars	E.	51 47 40	2901	50 15 22	2917	48 43 25	2935	47 11 50	2952
	α Pegasi	E.	59 32 15	2849	57 58 50	2870	56 25 54	2894	54 53 28	2918
	α Arietis	E.	101 30 10	2656	99 52 34	2673	98 15 18	2687	96 38 21	2708
15	SUN	W.	42 34 17	3133	44 1 46	3148	45 28 57	3163	46 55 50	3178
	Mars	E.	39 39 26	3043	38 10 5	3059	36 41 5	3077	35 12 27	3096
	α Pegasi	E.	47 19 16	3003	45 50 9	3063	44 21 39	3116	42 53 49	3149
	α Arietis	E.	88 38 37	2777	87 3 39	2791	85 28 59	2805	83 54 38	2819
16	SUN	W.	54 5 56	3250	55 31 6	3263	56 56 1	3276	58 20 41	3288
	Mars	E.	27 55 9	3196	26 28 55	3219	25 3 8	3240	23 37 46	3266
	α Pegasi	E.	35 45 40	3268	34 22 36	3411	33 0 32	3470	31 39 34	3532
	α Arietis	E.	76 7 23	2988	74 34 49	2901	73 2 31	2913	71 30 28	2926
17	SUN	W.	65 20 22	3348	66 43 38	3366	68 6 42	3389	69 29 34	3379
	α Arietis	E.	63 54 5	2993	62 23 31	2993	60 53 9	3004	59 23 1	3012
	Aldebaran	E.	96 28 19	3020	94 58 31	3030	93 28 56	3039	91 59 31	3047
18	SUN	W.	76 21 19	3421	77 43 12	3427	79 4 58	3434	80 26 36	3439
	α Aquilæ	W.	48 35 11	4137	49 44 37	4097	50 54 42	4054	52 5 26	4022
	α Arietis	E.	51 55 8	3066	50 26 5	3064	48 57 11	3070	47 28 25	3078
	Aldebaran	E.	84 35 4	3087	83 6 39	3093	81 38 21	3101	80 10 13	3106
19	SUN	W.	87 13 21	3461	88 34 29	3463	89 55 34	3466	91 16 37	3467
	α Aquilæ	W.	58 6 51	3963	59 20 28	3961	60 34 27	3940	61 48 48	3920
	α Arietis	E.	40 6 36	3107	38 38 35	3112	37 10 40	3116	35 42 52	3126
	Aldebaran	E.	72 51 3	3130	71 23 30	3133	69 56 1	3138	68 28 37	3139
20	SUN	W.	98 1 36	3468	99 22 37	3465	100 43 40	3463	102 4 46	3460
	α Aquilæ	W.	68 5 14	3737	69 21 22	3723	70 37 45	3709	71 54 22	3696
	Fomalhaut	W.	43 36 33	4008	44 48 5	3959	46 0 25	3914	47 13 31	3872
	α Arietis	E.	28 25 21	3148	26 58 9	3153	25 31 3	3158	24 4 3	3164
	Aldebaran	E.	61 12 13	3148	59 45 1	3149	58 17 51	3149	56 50 41	3150
21	SUN	W.	108 51 12	3429	110 12 46	3422	111 34 26	3426	112 56 13	3420
	α Aquilæ	W.	78 20 49	3696	79 38 44	3626	80 56 51	3614	82 15 10	3604
	Fomalhaut	W.	53 28 52	3992	54 45 40	3977	56 2 59	3944	57 20 47	3916
	Mars	W.	29 21 31	3372	30 44 19	3392	32 7 19	3361	33 30 32	3339
	Aldebaran	E.	49 34 52	3148	48 7 41	3148	46 40 28	3148	45 13 16	3147
	Pollux	E.	91 18 18	3636	89 49 39	3626	88 20 53	3614	86 52 1	3604
22	SUN	W.	119 47 11	3379	121 9 51	3369	122 32 43	3360	123 55 45	3350
	α Aquilæ	W.	88 49 24	3657	90 8 45	3649	91 28 15	3640	92 47 55	3633
	Fomalhaut	W.	63 56 30	3901	65 16 53	3890	66 37 39	3880	67 58 48	3842
	Mars	W.	40 29 47	3286	41 54 15	3278	43 18 56	3263	44 43 51	3252
	Aldebaran	E.	37 57 12	3151	36 30 4	3153	35 2 59	3158	33 36 0	3162
	Pollux	E.	79 25 38	3622	77 55 53	3616	76 25 59	3606	74 55 54	3597
23	SUN	W.	130 54 0	3294	132 18 18	3282	133 42 51	3270	135 7 38	3260
	Fomalhaut	W.	74 49 49	3951	76 13 2	3933	77 36 35	3918	79 0 26	3901
	α Pegasi	W.	52 38 3	3192	54 5 10	3139	55 32 42	3113	57 0 38	3098
	Mars	W.	51 51 51	3191	53 18 11	3178	54 44 46	3166	56 11 36	3153
	Pollux	E.	67 22 36	2949	65 51 19	2939	64 19 49	2928	62 48 6	2918
	Jupiter	E.	103 7 38	2912	101 35 35	2902	100 3 19	2890	98 30 47	2879



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of DIST.	III <sup>h</sup> .	P. L. of DIST.	VI <sup>h</sup> .	P. L. of DIST.	IX <sup>h</sup> .	P. L. of DIST.
24	Fomalhaut W.	80 24 36	2926	81 49 4	2970	83 13 51	2927	84 38 53	2928
	α Pegasi W.	58 28 55	2978	59 57 37	2986	61 26 41	2988	62 56 7	2990
	Mars W.	57 38 42	3139	59 6 4	3127	60 33 41	3112	62 1 36	3099
	Pollux E.	61 16 10	2907	59 44 0	2896	58 11 36	2885	56 38 58	2874
	Jupiter E.	96 58 1	2866	95 24 59	2846	93 51 42	2841	92 18 8	2830
	Regulus E.	98 6 25	2877	96 33 37	2866	95 0 34	2864	93 27 16	2842
25	α Pegasi W.	70 28 41	2935	72 0 15	2920	73 32 8	2905	75 4 22	2888
	Mars W.	69 25 90	2928	70 54 57	2916	72 24 50	2900	73 55 3	2898
	α Arietis W.	26 59 6	2842	28 32 40	2822	30 6 39	2802	31 41 4	2785
	Pollux E.	48 52 18	2821	47 18 17	2811	45 44 3	2800	44 9 35	2790
	Jupiter E.	84 26 13	2766	82 51 0	2753	81 15 30	2739	79 39 42	2726
	Regulus E.	85 36 42	2777	84 1 44	2764	82 26 29	2752	80 50 58	2738
26	α Pegasi W.	82 50 23	2815	84 24 32	2801	85 58 50	2787	87 33 43	2774
	Mars W.	81 30 26	2816	83 2 24	2808	84 34 39	2808	86 7 13	2876
	α Arietis W.	39 38 50	2701	41 15 29	2687	42 52 27	2670	44 29 47	2657
	Pollux E.	36 14 13	2748	34 38 38	2743	33 2 55	2739	31 27 7	2735
	Jupiter E.	71 36 18	2680	69 58 45	2648	68 20 54	2635	66 42 46	2622
	Regulus E.	72 48 59	2673	71 11 42	2660	69 34 9	2648	67 56 19	2635
	Saturn E.	84 19 7	2681	82 42 1	2668	81 4 38	2655	79 26 57	2642
27	α Pegasi W.	95 31 38	2712	97 8 0	2702	98 44 37	2692	100 21 28	2682
	Mars W.	93 54 16	2810	95 28 31	2798	97 3 2	2784	98 37 51	2773
	α Arietis W.	52 41 11	2697	54 20 24	2674	55 59 55	2661	57 39 44	2649
	Aldebaran W.	21 42 57	2678	23 13 37	2614	24 45 38	2609	26 18 50	2612
	Jupiter E.	58 27 52	2561	56 48 4	2586	55 8 0	2588	53 27 40	2627
	Regulus E.	59 42 53	2674	58 3 22	2662	56 23 35	2651	54 43 32	2640
	Saturn E.	71 14 22	2581	69 35 1	2670	67 55 25	2659	66 15 33	2648
28	Mars W.	106 35 41	2716	108 11 59	2706	109 48 31	2696	111 25 16	2687
	α Arietis W.	66 2 55	2491	67 44 21	2481	69 26 1	2470	71 7 56	2460
	Aldebaran W.	34 17 57	2654	35 55 49	2623	37 34 13	2601	39 13 6	2600
	Jupiter E.	45 2 19	2477	43 20 34	2466	41 38 36	2460	39 56 26	2452
	Regulus E.	46 19 36	2489	44 38 7	2480	42 56 25	2471	41 14 31	2462
	Saturn E.	57 52 31	2497	56 11 13	2488	54 29 43	2480	52 48 1	2472
	Spica E.	100 21 22	2480	98 39 41	2470	96 57 45	2460	95 15 35	2450
29	α Arietis W.	79 40 55	2415	81 24 8	2408	83 7 32	2390	84 51 8	2382
	Aldebaran W.	47 33 50	2300	49 15 3	2487	50 56 34	2475	52 38 22	2465
	Jupiter E.	31 23 5	2421	29 40 0	2418	27 56 51	2416	26 13 39	2415
	Regulus E.	32 42 16	2427	30 59 20	2422	29 16 17	2418	27 33 8	2415
	Saturn E.	44 16 50	2428	42 34 9	2423	40 51 21	2429	39 8 27	2426
	Spica E.	86 41 29	2408	84 58 3	2396	83 14 26	2391	81 30 39	2384
30	α Arietis W.	93 31 33	2381	95 18 4	2355	97 2 43	2350	98 47 29	2346
	Aldebaran W.	61 11 1	2417	62 54 11	2410	64 37 32	2408	66 21 3	2395
	Saturn E.	30 33 13	2424	28 50 13	2429	27 7 20	2427	25 24 38	2446
	Spica E.	72 49 15	2348	71 4 32	2346	69 19 42	2343	67 34 45	2338
	Venus E.	118 0 51	2772	116 25 46	2766	114 50 32	2759	113 15 10	2758
31	Aldebaran W.	75 0 45	2370	76 45 3	2367	78 29 25	2363	80 13 53	2359
	Pollux W.	33 1 49	2408	34 45 21	2391	36 29 8	2382	38 13 8	2373
	Spica E.	58 48 28	2320	57 2 58	2317	55 17 24	2315	53 31 47	2313
	Venus E.	105 16 30	2728	103 40 27	2726	102 4 20	2721	100 28 8	2718



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
24	Fomalhaut W.	86 4 13	2296	87 29 51	2314	88 55 44	2300	90 21 53	2188
	α Pegasi W.	64 25 56	2002	65 56 6	2005	67 26 37	2009	68 57 28	2002
	Mars W.	63 29 47	2085	64 58 15	2072	66 26 59	2087	67 56 1	2043
	Pollux E.	55 6 6	2863	53 33 0	2882	51 59 40	2842	50 26 6	2831
	Jupiter E.	90 44 19	2817	89 10 13	2804	87 35 50	2791	86 1 10	2778
	Regulus E.	91 53 42	2880	90 19 52	2818	88 45 45	2804	87 11 22	2791
25	α Pegasi W.	76 36 55	2673	78 9 48	2616	79 43 1	2643	81 16 35	2631
	Mars W.	75 25 31	2672	76 56 19	2630	78 27 23	2644	79 58 46	2681
	α Arietis W.	33 15 52	2786	34 51 4	2780	36 26 37	2782	38 2 34	2718
	Pollux E.	42 34 54	2780	41 0 0	2772	39 24 55	2763	37 49 39	2766
	Jupiter E.	78 3 36	2712	76 27 12	2699	74 50 31	2697	73 13 33	2674
	Regulus E.	79 15 9	2736	77 39 2	2708	76 2 38	2680	74 25 57	2687
26	α Pegasi W.	80 8 45	2761	80 44 4	2740	82 19 39	2736	83 55 31	2725
	Mars W.	87 40 3	2682	89 13 11	2649	90 46 35	2635	92 20 18	2623
	α Arietis W.	46 7 25	2642	47 45 23	2628	49 23 40	2613	51 2 17	2601
	Pollux E.	29 51 14	2734	28 15 19	2730	26 39 26	2740	25 3 39	2748
	Jupiter E.	65 4 21	2610	63 25 39	2607	61 46 40	2595	60 7 24	2573
	Regulus E.	66 18 12	2622	64 39 47	2610	63 1 5	2598	61 22 7	2586
27	α Pegasi W.	101 58 39	2672	103 35 49	2663	105 13 18	2655	106 50 58	2648
	Mars W.	100 12 54	2761	101 48 13	2749	103 23 48	2738	104 59 37	2727
	α Arietis W.	59 19 49	2636	61 0 19	2626	62 40 50	2613	64 21 45	2603
	Aldebaran W.	27 53 9	2770	29 28 9	2732	31 4 4	2705	32 40 41	2673
	Jupiter E.	51 47 5	2677	50 6 15	2606	48 25 10	2496	46 43 51	2487
	Regulus E.	53 3 15	2629	51 22 42	2618	49 41 54	2607	48 0 51	2499
28	α Pegasi W.	64 35 26	2687	62 55 4	2626	61 14 27	2616	59 33 36	2606
	Mars W.	113 2 14	2677	114 39 25	2669	116 16 47	2660	117 54 21	2652
	α Arietis W.	72 50 5	2450	74 39 29	2442	76 15 4	2432	77 57 53	2423
	Aldebaran W.	40 52 28	2562	42 39 15	2545	44 12 25	2530	45 52 57	2516
	Jupiter E.	38 14 5	2446	36 31 34	2438	34 48 52	2431	33 6 3	2426
	Regulus E.	39 32 25	2454	37 50 7	2447	36 7 39	2441	34 25 1	2434
29	α Pegasi W.	51 6 7	2463	49 24 2	2455	47 41 47	2450	45 59 23	2443
	Spica E.	93 33 11	2441	91 50 34	2432	90 7 45	2423	88 24 43	2415
	α Arietis W.	86 34 54	2386	88 18 50	2380	90 2 55	2372	91 47 10	2365
	Aldebaran W.	54 20 25	2428	56 2 44	2423	57 45 17	2414	59 28 3	2406
	Jupiter E.	24 30 26	2416	22 47 13	2418	21 4 4	2424	19 21 4	2436
	Regulus E.	25 49 54	2414	24 6 39	2416	22 23 27	2420	20 40 21	2428
30	α Pegasi W.	37 25 29	2422	35 42 26	2422	33 59 22	2421	32 16 17	2422
	Spica E.	79 46 41	2377	78 2 33	2370	76 18 16	2364	74 33 50	2356
	α Arietis W.	100 30 22	2343	102 15 21	2338	104 0 25	2334	105 45 35	2330
	Aldebaran W.	68 4 44	2380	69 48 33	2384	71 32 30	2380	73 16 34	2375
	Saturn E.	23 42 9	2460	21 59 59	2479	20 18 17	2506	18 37 12	2540
	Spica E.	65 49 41	2334	64 4 31	2330	62 19 15	2326	60 33 54	2323
31	Venus E.	111 39 40	2747	110 4 3	2741	108 28 18	2737	106 52 27	2732
	Aldebaran W.	81 58 27	2346	83 43 5	2354	85 27 45	2363	87 12 27	2360
	Pollux W.	39 57 21	2386	41 41 44	2389	43 26 17	2394	45 10 58	2398
	Spica E.	51 46 7	2311	50 0 24	2310	48 14 39	2309	46 28 52	2307
	Venus E.	96 51 52	2714	97 15 31	2713	95 39 7	2710	94 2 41	2709



## GREENWICH MEAN TIME.

JANUARY.							FEBRUARY.						
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.		Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	
Noon.	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	Noon.		
h. m. s.	s.	O I N	"	h. m.			h. m. s.	s.	O I N	"	h. m.		
1	20 25 58.92	12.990	-20 53 13.1	42.67	1 44.6		1	22 56 32.45	11.383	- 8 14 30.6	74.61	2 12.9	
2	20 31 10.03	12.935	20 35 51.1	44.16	1 45.9		2	23 1 5.19	11.346	7 44 36.3	75.01	2 13.5	
3	20 36 19.83	12.880	20 17 53.6	45.62	1 47.1		3	23 5 37.05	11.310	7 14 30.3	75.48	2 14.1	
4	20 41 28.30	12.824	19 59 21.3	47.06	1 48.2		4	23 10 8.07	11.275	6 44 13.4	75.93	2 14.7	
5	20 46 35.42	12.766	19 40 14.6	48.48	1 49.4		5	23 14 38.28	11.243	6 13 46.4	76.32	2 15.2	
6	20 51 41.19	12.709	19 20 34.2	49.87	1 50.5		6	23 19 7.72	11.212	5 43 10.1	76.69	2 15.8	
7	20 56 45.59	12.654	19 0 21.0	51.22	1 51.7		7	23 23 36.43	11.182	5 12 25.1	77.04	2 16.3	
8	21 1 48.61	12.597	18 39 35.8	52.53	1 52.8		8	23 28 4.44	11.153	4 41 32.1	77.36	2 16.8	
9	21 6 50.26	12.540	18 18 19.4	53.82	1 53.9		9	23 32 31.80	11.128	4 10 32.0	77.64	2 17.3	
10	21 11 50.52	12.483	17 56 32.4	55.08	1 54.9		10	23 36 58.56	11.103	3 39 25.4	77.89	2 17.8	
11	21 16 49.41	12.425	17 34 15.5	56.31	1 56.0		11	23 41 24.75	11.080	3 8 13.1	78.12	2 18.3	
12	21 21 46.94	12.368	17 11 29.6	57.50	1 57.0		12	23 45 50.41	11.059	2 36 55.8	78.31	2 18.8	
13	21 26 43.10	12.312	16 48 15.3	58.66	1 58.0		13	23 50 15.58	11.039	2 5 34.3	78.47	2 19.3	
14	21 31 37.91	12.256	16 24 33.5	59.80	1 58.9		14	23 54 40.32	11.022	1 34 9.1	78.61	2 19.8	
15	21 36 31.38	12.200	16 0 24.9	60.90	1 59.9		15	23 59 4.65	11.006	1 2 41.1	78.71	2 20.2	
16	21 41 23.53	12.145	15 35 50.3	61.96	2 0.8		16	0 3 28.62	10.992	- 0 31 11.0	78.78	2 20.7	
17	21 46 14.34	12.090	15 10 50.2	63.00	2 1.7		17	0 7 52.28	10.978	+ 0 0 20.4	78.82	2 21.1	
18	21 51 3.85	12.036	14 45 25.9	64.00	2 2.6		18	0 12 15.62	10.967	0 31 52.4	78.83	2 21.6	
19	21 55 52.08	11.983	14 19 38.1	64.97	2 3.5		19	0 16 38.71	10.959	1 3 24.4	78.81	2 22.0	
20	22 0 39.05	11.931	13 53 27.4	65.91	2 4.3		20	0 21 1.61	10.950	1 34 55.4	78.76	2 22.5	
21	22 5 24.79	11.880	13 26 54.6	66.81	2 5.1		21	0 25 24.33	10.944	2 6 24.8	78.67	2 22.9	
22	22 10 9.30	11.829	13 0 0.6	67.67	2 5.9		22	0 29 46.93	10.939	2 37 51.9	78.57	2 23.3	
23	22 14 52.61	11.780	12 32 46.2	68.51	2 6.7		23	0 34 9.42	10.936	3 9 16.0	78.43	2 23.7	
24	22 19 34.73	11.731	12 5 12.2	69.31	2 7.4		24	0 38 31.87	10.933	3 40 36.4	78.36	2 24.2	
25	22 24 15.70	11.683	11 37 19.4	70.09	2 8.2		25	0 42 54.29	10.934	4 11 52.3	78.06	2 24.6	
26	22 28 55.54	11.637	11 9 8.5	70.81	2 8.9		26	0 47 16.72	10.935	4 43 2.9	77.81	2 25.1	
27	22 33 34.29	11.592	10 40 40.4	71.51	2 9.6		27	0 51 39.18	10.937	5 14 7.3	77.56	2 25.5	
28	22 38 11.95	11.547	10 11 56.0	72.17	2 10.3		28	0 56 1.70	10.940	5 45 5.0	77.25	2 25.9	
29	22 42 48.57	11.504	9 42 56.0	72.81	2 11.0		29	1 0 24.32	10.946	6 15 55.3	76.92	2 26.3	
30	22 47 24.17	11.463	9 13 41.3	73.40	2 11.6		30	1 4 47.09	10.952	6 46 37.4	76.57	2 26.8	
31	22 51 58.79	11.422	8 44 12.6	73.97	2 12.3		31	1 9 10.02	10.959	7 17 10.5	76.18	2 27.2	
32	22 56 32.45	11.383	- 8 14 30.6	74.51	2 12.9		32	1 13 33.15	10.968	+ 7 47 34.1	75.77	2 27.6	
Day of Month, 1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month,	5th.	10th.	15th.	20th.	25th.	30th.
Semidiam.	5.6	5.7	5.8	5.9	6.0	6.1	Semidiameter	6.3	6.4	6.5	6.7	6.8	7.0
Hor. Par.	5.7	5.7	5.8	5.9	6.0	6.1	Hor. Parallax	6.3	6.5	6.6	6.7	6.9	7.1



## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	1 4 47.09	10.982	+ 6 46 37.4	76.57	2 26.8	1	3 24 4.24	11.601	+20 27 52.0	51.40	2 43.9
2	1 9 10.02	10.989	7 17 10.5	76.18	2 27.2	2	3 28 42.93	11.621	20 48 10.5	50.14	2 44.6
3	1 13 33.15	10.968	7 47 34.1	75.77	2 27.6	3	3 33 22.12	11.643	21 7 58.9	48.88	2 45.3
4	1 17 56.51	10.979	8 17 47.5	75.38	2 28.0	4	3 38 1.79	11.662	21 27 16.6	47.59	2 46.0
5	1 22 20.14	10.991	8 47 49.9	74.96	2 28.5	5	3 42 41.92	11.681	21 46 8.0	46.28	2 46.7
6	1 26 44.06	11.004	9 17 40.5	74.55	2 28.9	6	3 47 22.47	11.698	22 4 17.8	44.96	2 47.5
7	1 31 8.32	11.018	9 47 18.6	73.81	2 29.4	7	3 52 3.43	11.714	22 22 0.7	43.61	2 48.2
8	1 35 32.92	11.033	10 16 43.5	73.25	2 29.9	8	3 56 44.74	11.727	22 39 11.1	42.24	2 49.0
9	1 39 57.92	11.050	10 45 54.8	72.68	2 30.4	9	4 1 26.36	11.741	22 55 48.4	40.86	2 49.7
10	1 44 23.33	11.068	11 14 51.8	72.06	2 30.9	10	4 6 8.29	11.752	23 11 52.2	39.45	2 50.5
11	1 48 49.19	11.087	11 43 33.6	71.41	2 31.4	11	4 10 50.48	11.761	23 27 22.0	38.03	2 51.2
12	1 53 15.51	11.107	12 11 59.6	70.74	2 31.9	12	4 15 32.87	11.769	23 42 17.5	36.59	2 52.0
13	1 57 42.31	11.129	12 40 9.0	70.03	2 32.4	13	4 20 15.43	11.776	23 56 38.5	35.16	2 52.8
14	2 2 9.64	11.150	13 8 1.3	69.31	2 32.9	14	4 24 58.11	11.779	24 10 24.6	33.69	2 53.6
15	2 6 37.51	11.173	13 35 35.7	68.65	2 33.4	15	4 29 40.83	11.779	24 23 35.2	32.20	2 54.3
16	2 11 5.94	11.197	14 2 51.6	67.76	2 33.9	16	4 34 23.55	11.779	24 36 10.2	30.70	2 55.1
17	2 15 34.95	11.221	14 29 48.2	66.94	2 34.5	17	4 39 6.20	11.774	24 48 9.8	29.21	2 55.8
18	2 20 4.55	11.246	14 56 24.9	66.10	2 35.0	18	4 43 48.74	11.768	24 59 32.5	27.71	2 56.6
19	2 24 34.77	11.272	15 22 41.0	65.23	2 35.6	19	4 48 31.09	11.759	25 10 19.3	26.16	2 57.3
20	2 29 5.60	11.297	15 48 35.9	64.33	2 36.2	20	4 53 13.19	11.746	25 20 29.3	24.66	2 58.1
21	2 33 37.06	11.326	16 14 8.9	63.40	2 36.8	21	4 57 54.95	11.731	25 30 2.5	23.12	2 58.9
22	2 38 9.16	11.350	16 39 19.2	62.44	2 37.4	22	5 2 36.28	11.712	25 38 59.0	21.68	2 59.6
23	2 42 41.88	11.377	17 4 6.2	61.46	2 38.0	23	5 7 17.12	11.689	25 47 18.4	20.03	3 0.3
24	2 47 15.25	11.403	17 28 29.3	60.45	2 38.6	24	5 11 57.38	11.663	25 55 0.6	18.48	3 1.1
25	2 51 49.25	11.430	17 52 27.7	59.40	2 39.2	25	5 16 36.97	11.634	26 2 5.6	16.94	3 1.8
26	2 56 23.89	11.455	18 16 0.7	58.32	2 39.8	26	5 21 15.80	11.600	26 8 33.6	15.39	3 2.5
27	3 0 59.18	11.481	18 39 7.8	57.24	2 40.5	27	5 25 53.79	11.563	26 14 24.5	13.85	3 3.2
28	3 5 34.98	11.506	19 1 48.3	56.13	2 41.1	28	5 30 30.83	11.521	26 19 38.3	12.30	3 3.9
29	3 10 11.43	11.531	19 24 1.6	54.97	2 41.8	29	5 35 6.83	11.476	26 24 15.0	10.76	3 4.5
30	3 14 48.47	11.556	19 45 47.0	53.80	2 42.5	30	5 39 41.69	11.427	26 28 15.0	9.23	3 5.2
31	3 19 26.08	11.578	20 7 4.0	52.60	2 43.2	31	5 44 15.31	11.375	26 31 38.3	7.71	3 5.8
32	3 24 4.24	11.601	+20 27 52.0	51.40	2 43.9	32	5 48 47.61	11.316	+26 34 25.1	6.30	3 6.4

Day of Month, 1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month,	5th.	10th.	15th.	20th.	25th.	30th.
Semidiam.	7.0	7.2	7.4	7.6	7.9	8.1	Semidiameter	8.7	9.0	9.4	9.8	10.3	10.8
Hor. Par.	7.1	7.2	7.4	7.7	7.9	8.2	Hor. Parallax	8.8	9.1	9.5	9.9	10.4	10.9



## GREENWICH MEAN TIME.

MAY.							JUNE.														
Day of Month.	Apparent Right Ascension.			Var. of R.A. for 1 Hour.		Apparent Declination.		Var. of Dec. for 1 Hour.		Meridian Passage.	Day of Month.	Apparent Right Ascension.			Var. of R.A. for 1 Hour.		Apparent Declination.		Var. of Dec. for 1 Hour.		Meridian Passage.
	Noon.			Noon.		Noon.		Noon.				Noon.			Noon.		Noon.		Noon.		
	h.	m.	s.	s.	°	'	"	"	h.			m.	s.	s.	°	'	"	"	h.	m.	
1	5	44	15.31	11.375	+26	31	38.3	7.71	8	5.8	1	7	46	07.69	7.591	+23	52	6.0	28.94	8	5.2
2	5	48	47.61	11.316	26	34	25.1	6.30	8	6.4	2	7	49	5.21	7.399	23	40	23.5	29.58	8	4.2
3	5	53	18.49	11.256	26	36	35.7	4.69	8	6.9	3	7	51	57.59	7.073	23	28	26.1	30.17	8	3.2
4	5	57	47.86	11.190	26	38	10.4	3.90	8	7.5	4	7	54	44.67	6.948	23	16	14.9	30.73	8	2.0
5	6	2	15.62	11.121	26	39	9.4	1.73	8	8.0	5	7	57	26.29	6.616	23	8	51.0	31.24	8	0.7
6	6	6	41.66	11.047	26	39	33.0	+0.25	8	8.5	6	8	0	2.26	6.378	22	51	15.5	31.70	2	59.3
7	6	11	5.88	10.969	26	39	21.6	-1.19	8	8.9	7	8	2	32.43	6.133	22	38	29.6	32.11	2	57.9
8	6	15	28.19	10.887	26	38	35.5	2.63	8	9.4	8	8	4	56.63	5.891	22	25	34.4	32.47	2	56.3
9	6	19	48.48	10.801	26	37	15.2	4.06	8	9.8	9	8	7	14.70	5.631	22	12	31.0	32.79	2	54.7
10	6	24	6.65	10.710	26	35	21.2	5.44	8	10.2	10	8	9	26.45	5.364	21	59	20.8	33.07	2	52.9
11	6	28	22.61	10.617	26	32	53.9	6.82	8	10.4	11	8	11	31.69	5.079	21	46	3.4	33.31	2	51.1
12	6	32	36.26	10.518	26	29	53.9	8.17	8	10.7	12	8	13	30.24	4.796	21	32	41.6	33.48	2	49.0
13	6	36	47.49	10.415	26	26	21.5	9.51	8	10.9	13	8	15	21.89	4.504	21	19	16.2	33.61	2	47.0
14	6	40	56.19	10.308	26	22	17.2	10.83	8	11.1	14	8	17	6.45	4.206	21	5	48.5	33.68	2	44.3
15	6	45	2.26	10.196	26	17	41.8	12.11	8	11.2	15	8	18	43.72	3.897	20	52	19.4	33.79	2	42.5
16	6	49	5.61	10.080	26	12	35.9	13.37	8	11.4	16	8	20	13.50	3.580	20	38	50.1	33.70	2	40.0
17	6	53	6.11	9.959	26	7	0.1	14.59	8	11.4	17	8	21	35.57	3.264	20	25	22.0	33.62	2	37.4
18	6	57	3.65	9.838	26	0	55.2	15.79	8	11.5	18	8	22	49.70	2.919	20	11	56.5	33.48	2	34.7
19	7	0	58.12	9.703	25	54	21.8	16.97	8	11.4	19	8	23	55.68	2.574	19	58	34.7	33.30	2	31.9
20	7	4	49.39	9.566	25	47	20.6	18.11	8	11.4	20	8	24	53.27	2.230	19	45	17.9	33.06	2	28.9
21	7	8	37.33	9.426	25	39	52.3	19.23	8	11.2	21	8	25	42.25	1.897	19	32	7.5	32.77	2	25.8
22	7	12	21.83	9.280	25	31	57.8	20.30	8	11.0	22	8	26	22.42	1.486	19	19	4.7	32.43	2	22.4
23	7	16	2.75	9.128	25	23	37.9	21.34	8	10.7	23	8	26	53.57	1.105	19	6	10.8	32.03	2	19.0
24	7	19	39.97	8.971	25	14	53.4	22.34	8	10.4	24	8	27	15.48	0.717	18	53	27.1	31.68	2	15.4
25	7	23	13.35	8.808	25	5	45.4	23.31	8	10.0	25	8	27	27.97	+0.391	18	40	55.0	31.07	2	11.7
26	7	26	42.76	8.640	24	56	14.7	24.23	8	9.5	26	8	27	30.90	-0.079	18	28	35.7	30.41	2	7.3
27	7	30	8.05	8.465	24	46	22.2	25.12	8	8.9	27	8	27	24.14	0.486	18	16	30.4	29.90	2	3.3
28	7	33	29.03	8.284	24	36	8.8	25.97	8	8.4	28	8	27	07.55	0.098	18	4	40.3	29.34	1	59.5
29	7	36	45.70	8.098	24	25	35.4	26.79	8	7.7	29	8	26	41.01	1.314	17	53	6.7	28.43	1	55.2
30	7	39	57.78	7.906	24	14	43.1	27.55	8	7.0	30	8	26	4.43	1.739	17	41	50.6	27.78	1	50.6
31	7	43	5.16	7.706	24	3	32.9	28.27	8	6.1	31	8	25	17.96	2.144	17	30	53.0	26.99	1	45.9
32	7	46	7.69	7.501	+23	52	6.0	28.94	8	5.2	32	8	24	21.54	2.567	+17	20	14.9	26.16	1	41.0
Day of the Month, 5th. 10th. 15th. 20th. 25th. 30th.							Day of the Month, 4th. 9th. 14th. 19th. 24th. 29th.														
Semidiameter 11.4 12.1 12.8 13.6 14.5 15.6							Semidiameter 16.7 18.0 19.5 21.2 23.0 24.8														
Hor. Parallax 11.5 12.1 12.9 13.7 14.6 15.7							Hor. Parallax 16.8 18.2 19.7 21.3 23.1 25.0														



## GREENWICH MEAN TIME.

### JULY.

### AUGUST.

Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"			h. m. s.	s.	° ' "	"	
1	8 25 17.98	3.144	+17 30 53.0	24.30	1 45.9	1	7 20 34.33	3.331	+15 9 36.6	3.90	22 34.4
2	8 24 21.54	3.487	17 20 14.9	24.16	1 41.0	2	7 19 19.21	3.924	15 11 20.9	4.59	22 29.5
3	8 23 15.24	3.964	17 9 57.1	23.30	1 36.0	3	7 18 13.96	3.510	15 13 18.9	5.32	22 24.6
4	8 21 59.24	3.384	17 0 0.5	24.40	1 30.7	4	7 17 18.73	3.094	15 15 31.4	5.79	22 19.8
5	8 20 33.74	3.784	16 50 26.0	23.46	1 25.4	5	7 16 33.57	1.671	15 17 56.9	6.30	22 15.3
6	8 18 59.08	4.132	16 41 14.3	23.49	1 19.6	6	7 15 58.51	1.280	15 20 34.0	6.76	22 11.0
7	8 17 15.46	4.493	16 32 26.1	21.81	1 14.2	7	7 15 33.53	0.830	15 23 21.4	7.16	22 6.8
8	8 15 23.43	4.834	16 24 1.8	20.61	1 8.4	8	7 15 18.56	0.416	15 26 17.7	7.60	22 2.8
9	8 13 23.40	5.197	16 16 1.8	19.48	1 2.5	9	7 15 13.51	-0.013	15 29 21.3	7.77	21 58.9
10	8 11 15.91	5.484	16 8 26.7	18.43	0 56.4	10	7 15 18.26	+0.396	15 32 30.7	7.97	21 55.2
11	8 9 1.59	5.738	16 1 17.0	17.37	0 50.3	11	7 15 32.64	0.796	15 35 44.3	8.13	21 51.7
12	8 6 41.13	5.968	15 54 33.0	16.29	0 44.0	12	7 15 56.48	1.186	15 39 0.7	8.31	21 48.3
13	8 4 13.27	6.173	15 46 14.9	15.31	0 37.7	13	7 16 29.57	1.567	15 42 18.5	8.34	21 45.0
14	8 1 44.84	6.345	15 42 22.9	14.11	0 31.3	14	7 17 11.69	1.938	15 45 36.2	8.31	21 41.9
15	7 59 16.70	6.483	15 36 57.3	13.01	0 24.8	15	7 18 2.57	2.298	15 48 52.5	8.12	21 38.9
16	7 56 33.72	6.579	15 31 58.2	11.91	0 18.3	16	7 19 1.97	2.647	15 52 6.2	7.99	21 36.1
17	7 53 54.88	6.639	15 27 25.4	10.81	0 11.7	17	7 20 9.62	2.986	15 55 16.2	7.81	21 33.4
18	7 51 15.12	6.668	15 23 19.2	9.70	0 5.2	18	7 21 25.29	3.316	15 58 21.0	7.66	21 30.8
19	7 48 35.32	6.689	15 19 39.6	8.60	23 52.1	19	7 22 48.75	3.634	16 1 19.0	7.25	21 28.4
20	7 45 56.42	6.591	15 16 26.3	7.51	23 45.5	20	7 24 19.74	3.943	16 4 9.1	6.89	21 26.2
21	7 43 19.43	6.483	15 13 39.3	6.41	23 39.1	21	7 25 56.00	4.241	16 6 50.1	6.49	21 23.9
22	7 40 45.27	6.366	15 11 18.3	5.34	23 32.6	22	7 27 48.32	4.531	16 9 20.8	6.04	21 21.8
23	7 38 14.86	6.169	15 9 23.0	4.28	23 26.3	23	7 29 35.46	4.809	16 11 40.1	5.54	21 19.8
24	7 35 49.15	5.989	15 7 52.9	3.34	23 20.0	24	7 31 34.17	5.078	16 13 46.9	4.99	21 18.0
25	7 33 28.91	5.714	15 6 47.5	2.32	23 13.9	25	7 33 39.21	5.337	16 15 40.0	4.40	21 16.2
26	7 31 14.87	5.444	15 6 6.2	1.33	23 7.8	26	7 35 50.36	5.588	16 17 18.3	3.77	21 14.6
27	7 29 7.66	5.144	15 5 48.4	-0.26	23 2.0	27	7 38 7.42	5.828	16 18 40.8	3.09	21 13.0
28	7 27 7.94	4.819	15 5 58.2	+0.65	22 56.2	28	7 40 30.17	6.062	16 19 46.4	2.36	21 11.6
29	7 25 16.31	4.473	15 6 19.6	1.83	22 50.5	29	7 42 56.41	6.287	16 20 34.2	1.60	21 10.1
30	7 23 23.23	4.166	15 7 6.7	2.37	22 44.9	30	7 45 31.94	6.503	16 21 3.3	+0.60	21 8.8
31	7 21 59.11	3.797	15 8 13.4	3.17	22 39.6	31	7 48 10.55	6.710	16 21 12.7	-0.04	21 7.6
32	7 20 34.33	3.331	+15 9 36.6	3.90	22 34.4	32	7 50 54.05	6.911	+16 21 1.5	0.90	21 6.5

Day of the Month,	4th.	9th.	14th.	19th.	24th.	29th.	Day of the Month,	3d.	8th.	13th.	18th.	23d.	28th.
Semidiameter	26.6"	26.1"	25.3"	24.4"	23.9"	23.8"	Semidiameter	26.3"	24.5"	22.7"	21.1"	19.5"	18.1"
Hor. Parallax	26.8"	28.3"	29.3"	29.6"	29.1"	28.0"	Hor. Parallax	26.5"	24.7"	22.9"	21.2"	19.6"	18.2"



## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	O I N	N	h. m.		h. m. s.	s.	O I N	N	h. m.
1	7 50 54.05	6.911	+16 21 1.5	0.90	21 6.5	1	9 37 24.82	10.087	+12 56 32.3	24.36	20 55.8
2	7 53 42.26	7.103	16 20 29.2	1.81	21 5.4	2	9 41 27.45	10.129	12 42 33.9	25.50	20 55.9
3	7 56 34.98	7.286	16 19 34.7	2.74	21 4.4	3	9 45 31.05	10.169	12 28 8.1	26.64	20 56.0
4	7 59 32.04	7.464	16 18 17.5	3.71	21 3.4	4	9 49 35.60	10.208	12 13 15.2	27.76	20 56.1
5	8 2 33.27	7.633	16 16 36.8	4.70	21 2.6	5	9 53 41.06	10.246	11 57 55.7	28.88	20 56.3
6	8 5 38.48	7.796	16 14 32.1	5.71	21 1.8	6	9 57 47.37	10.279	11 42 10.0	29.94	20 56.5
7	8 8 47.49	7.951	16 12 2.7	6.75	21 1.1	7	10 1 54.46	10.311	11 25 58.3	31.02	20 56.6
8	8 12 0.14	8.099	16 9 8.2	7.81	21 0.3	8	10 6 2.30	10.340	11 9 21.0	32.06	20 56.8
9	8 15 16.27	8.241	16 5 48.1	8.87	20 59.7	9	10 10 10.80	10.368	10 52 18.5	33.12	20 57.0
10	8 18 35.78	8.377	16 2 2.1	9.06	20 59.1	10	10 14 19.94	10.393	10 34 51.3	34.14	20 57.3
11	8 21 58.37	8.506	15 57 49.8	11.07	20 58.6	11	10 18 29.68	10.418	10 16 59.6	35.15	20 57.5
12	8 25 24.03	8.629	15 53 10.8	12.19	20 58.1	12	10 22 40.00	10.441	9 58 44.1	36.13	20 57.8
13	8 28 52.56	8.745	15 48 4.7	13.33	20 57.7	13	10 26 50.86	10.463	9 40 5.3	37.09	20 58.0
14	8 32 23.81	8.856	15 42 31.4	14.46	20 57.3	14	10 31 2.20	10.482	9 21 3.8	38.03	20 58.2
15	8 35 57.66	8.963	15 36 30.6	15.61	20 57.0	15	10 35 13.99	10.501	9 1 39.9	38.95	20 58.5
16	8 39 33.99	9.063	15 30 2.2	16.76	20 56.7	16	10 39 26.22	10.518	8 41 54.1	39.85	20 58.8
17	8 43 12.68	9.158	15 23 5.9	17.93	20 56.5	17	10 43 38.87	10.535	8 21 46.9	40.73	20 59.0
18	8 46 53.60	9.249	15 15 41.6	19.10	20 56.2	18	10 47 51.92	10.551	8 1 18.9	41.59	20 59.3
19	8 50 36.64	9.335	15 7 49.1	20.27	20 56.0	19	10 52 5.34	10.566	7 40 30.7	42.42	20 59.6
20	8 54 21.69	9.417	14 59 28.4	21.45	20 55.8	20	10 56 19.10	10.581	7 19 22.9	43.23	20 59.9
21	8 58 8.67	9.496	14 50 39.3	22.63	20 55.7	21	11 0 33.21	10.596	6 57 55.9	44.01	21 0.2
22	9 1 57.48	9.569	14 41 22.0	23.81	20 55.6	22	11 4 47.65	10.609	6 36 10.4	44.77	21 0.5
23	9 5 48.02	9.640	14 31 36.3	24.99	20 55.5	23	11 9 2.44	10.623	6 14 6.8	45.52	21 0.8
24	9 9 40.20	9.706	14 21 22.2	26.19	20 55.5	24	11 13 17.55	10.636	5 51 45.6	46.24	21 1.1
25	9 13 33.92	9.769	14 10 39.7	27.36	20 55.5	25	11 17 32.98	10.649	5 29 7.4	46.93	21 1.4
26	9 17 29.12	9.830	13 59 28.7	28.54	20 55.5	26	11 21 48.73	10.663	5 6 13.0	47.60	21 1.8
27	9 21 25.73	9.887	13 47 49.5	29.72	20 55.5	27	11 26 4.83	10.678	4 43 2.8	48.24	21 2.1
28	9 25 23.69	9.941	13 35 42.1	30.89	20 55.5	28	11 30 21.27	10.692	4 19 37.4	48.86	21 2.4
29	9 29 22.90	9.993	13 23 6.6	32.06	20 55.6	29	11 34 38.05	10.706	3 55 57.4	49.45	21 2.7
30	9 33 23.29	10.040	13 10 3.2	33.21	20 55.7	30	11 38 55.16	10.720	3 32 3.5	50.03	21 3.1
31	9 37 24.82	10.087	12 56 32.3	34.36	20 55.8	31	11 43 12.62	10.735	3 7 56.3	50.57	21 3.5
32	9 41 27.45	10.129	+12 42 33.9	35.50	20 55.9	32	11 47 30.43	10.749	+ 2 43 36.2	51.08	21 3.9
Day of Month, 3d.						Day of the Month,					
7th.						7th.					
13th.						13th.					
17th.						17th.					
23d.						23d.					
27th.						27th.					
33d.						33d.					
Semidiam. "						Semidiameter "					
16.8						11.0					
15.6						10.5					
14.6						10.1					
13.8						9.7					
13.0						9.3					
12.3						8.9					
11.6						8.5					
Hor. Par. "						Hor. Parallax "					
16.9						11.1					
15.8						10.6					
14.7						10.1					
13.9						9.7					
13.1						9.3					
12.3						9.0					
11.7						8.6					



## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.								
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.			
1	11 47 30.43	10.749	+ 2 43 36.2	61.08	21 3.9	1	14 0 23.65	11.529	-10 4 58.3	62.35	21 18.7			
2	11 51 48.61	10.765	2 19 4.4	61.56	21 4.2	2	14 5 0.83	11.570	10 29 49.4	61.90	21 19.4			
3	11 56 7.17	10.782	1 54 21.3	62.02	21 4.6	3	14 9 39.00	11.612	10 54 29.6	61.43	21 20.2			
4	12 0 26.14	10.799	1 29 27.6	62.44	21 4.9	4	14 14 18.20	11.655	11 18 58.1	60.92	21 20.9			
5	12 4 45.52	10.816	1 4 28.9	62.84	21 5.2	5	14 18 58.44	11.699	11 43 13.7	60.38	21 21.6			
6	12 9 5.29	10.832	0 39 11.1	63.21	21 5.6	6	14 23 39.76	11.744	12 7 15.5	59.77	21 22.4			
7	12 13 25.48	10.850	+ 0 13 49.8	63.55	21 6.1	7	14 28 22.14	11.789	12 31 3.0	59.16	21 23.2			
8	12 17 46.11	10.869	- 0 11 39.3	63.85	21 6.5	8	14 33 5.61	11.834	12 54 35.3	58.51	21 24.0			
9	12 22 7.19	10.888	0 37 15.3	64.13	21 6.9	9	14 37 50.17	11.880	13 17 51.4	57.82	21 24.8			
10	12 26 28.73	10.907	1 2 57.6	64.39	21 7.3	10	14 42 35.86	11.928	13 40 50.7	57.10	21 25.6			
11	12 30 50.76	10.928	1 28 45.5	64.60	21 7.8	11	14 47 22.69	11.976	14 3 32.3	56.34	21 26.4			
12	12 35 18.29	10.949	1 54 38.2	64.78	21 8.2	12	14 52 10.66	12.022	14 25 55.3	55.55	21 27.3			
13	12 39 36.32	10.970	2 20 34.9	64.93	21 8.7	13	14 56 59.77	12.070	14 47 58.9	54.73	21 28.2			
14	12 43 59.87	10.992	2 46 35.0	65.06	21 9.1	14	15 1 50.03	12.118	15 9 42.4	53.88	21 29.1			
15	12 48 28.98	11.016	3 12 37.7	65.15	21 9.6	15	15 6 41.46	12.168	15 31 5.0	52.99	21 30.1			
16	12 52 48.65	11.040	3 38 42.1	65.20	21 10.1	16	15 11 34.08	12.217	15 52 5.8	52.07	21 31.0			
17	12 57 18.91	11.065	4 4 47.4	65.23	21 10.6	17	15 16 27.86	12.265	16 12 44.2	51.11	21 32.0			
18	13 1 39.80	11.092	4 30 53.1	65.23	21 11.1	18	15 21 22.83	12.316	16 32 59.2	50.12	21 33.0			
19	13 6 6.32	11.119	4 56 58.5	65.20	21 11.6	19	15 26 18.97	12.364	16 52 50.1	49.10	21 34.0			
20	13 10 33.50	11.147	5 23 2.7	65.13	21 12.1	20	15 31 16.30	12.413	17 12 16.2	48.05	21 35.0			
21	13 15 1.36	11.176	5 49 4.8	65.03	21 12.7	21	15 36 14.82	12.463	17 31 16.7	46.97	21 36.1			
22	13 19 29.98	11.206	6 15 4.3	64.91	21 13.2	22	15 41 14.53	12.513	17 49 51.0	45.87	21 37.2			
23	13 23 59.24	11.237	6 41 0.7	64.77	21 13.8	23	15 46 15.43	12.562	18 7 58.3	44.72	21 38.3			
24	13 28 29.32	11.270	7 6 53.1	64.68	21 14.3	24	15 51 17.50	12.611	18 26 37.7	43.54	21 39.4			
25	13 33 0.20	11.304	7 32 40.5	64.55	21 14.9	25	15 56 20.74	12.659	18 42 48.5	42.34	21 40.5			
26	13 37 31.90	11.338	7 58 22.1	64.09	21 15.5	26	16 1 25.14	12.707	18 59 30.0	41.10	21 41.6			
27	13 42 4.44	11.374	8 23 57.2	63.83	21 16.2	27	16 6 30.69	12.755	19 15 41.5	39.85	21 42.8			
28	13 46 37.86	11.411	8 49 25.3	63.51	21 16.8	28	16 11 37.33	12.802	19 31 22.4	38.55	21 44.0			
29	13 51 12.18	11.449	9 14 45.5	63.15	21 17.4	29	16 16 45.20	12.849	19 46 31.9	37.23	21 45.2			
30	13 55 47.43	11.489	9 39 56.7	62.76	21 18.0	30	16 21 54.12	12.894	20 1 9.4	35.88	21 46.4			
31	14 0 23.65	11.529	10 4 58.3	62.35	21 18.7	31	16 27 4.13	12.939	20 15 14.1	34.51	21 47.7			
32	14 5 0.83	11.570	-10 29 49.4	61.90	21 19.4	32	16 32 15.21	12.984	-20 28 45.7	33.11	21 49.0			
Day of the Month,	1st.	6th.	11th.	16th.	21st.	26th.	Day of Month,	1st.	6th.	11th.	16th.	21st.	26th.	31st.
Semidiameter	" 8.9	" 8.6	" 8.3	" 8.0	" 7.8	" 7.6	Semidiam.	" 7.4	" 7.2	" 7.0	" 6.8	" 6.7	" 6.5	" 6.4
Hor. Parallax	9.0	8.7	8.4	8.1	7.8	7.6	Hor. Par.	7.4	7.2	7.0	6.9	6.7	6.6	6.4



## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	14 38 21.49	6.056	-14 26 33.9	23.29	19 55.6	1	15 54 45.32	6.243	-19 35 59.0	20.19	19 9.9
2	14 40 46.87	6.063	14 38 13.5	23.03	19 54.1	2	15 57 15.19	6.246	19 43 59.5	19.85	19 8.5
3	14 43 12.46	6.070	14 49 47.2	22.78	19 52.6	3	15 59 45.18	6.249	19 51 52.0	19.52	19 7.0
4	14 45 38.23	6.078	15 1 14.8	22.53	19 51.1	4	16 2 15.16	6.252	19 59 36.6	19.19	19 5.6
5	14 48 4.17	6.086	15 12 26.2	22.26	19 49.6	5	16 4 45.26	6.256	20 7 13.2	18.86	19 4.1
6	14 50 30.29	6.093	15 23 51.4	22.00	19 48.1	6	16 7 15.43	6.259	20 14 41.7	18.53	19 2.7
7	14 52 56.62	6.100	15 35 0.3	21.74	19 46.6	7	16 9 45.66	6.261	20 22 2.2	18.18	19 1.3
8	14 55 23.11	6.107	15 46 2.8	21.47	19 45.1	8	16 12 15.94	6.263	20 29 14.4	17.84	18 59.8
9	14 57 49.78	6.115	15 56 58.9	21.20	19 43.6	9	16 14 46.25	6.264	20 36 18.5	17.50	18 58.4
10	15 0 16.63	6.123	16 7 48.4	20.93	19 42.1	10	16 17 16.60	6.266	20 43 14.4	17.16	18 57.0
11	15 2 43.66	6.130	16 18 31.3	20.63	19 40.6	11	16 19 46.96	6.268	20 50 2.0	16.81	18 55.5
12	15 5 10.87	6.137	16 29 7.5	20.37	19 39.1	12	16 22 17.34	6.269	20 56 41.3	16.47	18 54.1
13	15 7 33.25	6.144	16 39 37.0	20.09	19 37.6	13	16 24 47.74	6.267	21 3 12.4	16.13	18 52.6
14	15 10 5.79	6.151	16 49 59.7	19.80	19 36.1	14	16 27 18.15	6.267	21 9 35.2	15.78	18 51.2
15	15 12 33.51	6.158	17 0 15.4	19.51	19 34.7	15	16 29 48.56	6.268	21 15 49.8	15.44	18 49.8
16	15 15 1.39	6.166	17 10 24.2	19.23	19 33.2	16	16 32 19.00	6.267	21 21 56.1	15.10	18 48.3
17	15 17 29.44	6.173	17 20 25.9	18.92	19 31.7	17	16 34 49.42	6.267	21 27 54.1	14.75	18 46.9
18	15 19 57.64	6.178	17 30 20.5	18.63	19 30.2	18	16 37 19.80	6.265	21 33 43.9	14.40	18 45.5
19	15 22 25.99	6.184	17 40 7.3	18.33	19 28.8	19	16 39 50.13	6.263	21 39 25.2	14.06	18 44.0
20	15 24 54.47	6.189	17 49 47.8	18.03	19 27.3	20	16 42 20.39	6.259	21 44 58.2	13.70	18 42.6
21	15 27 23.03	6.196	17 59 20.5	17.71	19 25.9	21	16 44 50.53	6.254	21 50 22.7	13.35	18 41.2
22	15 29 51.33	6.200	18 8 45.8	17.40	19 24.4	22	16 47 20.59	6.250	21 55 38.3	13.00	18 39.7
23	15 32 20.69	6.204	18 18 3.6	17.08	19 22.9	23	16 49 50.55	6.246	22 0 46.5	12.66	18 38.3
24	15 34 49.67	6.209	18 27 13.9	16.77	19 21.5	24	16 52 20.40	6.241	22 5 45.9	12.30	18 36.9
25	15 37 18.77	6.214	18 36 16.6	16.46	19 20.0	25	16 54 50.13	6.236	22 10 37.1	11.96	18 35.4
26	15 39 47.99	6.219	18 45 11.6	16.13	19 18.6	26	16 57 19.72	6.230	22 15 20.0	11.62	18 34.0
27	15 42 17.90	6.223	18 53 58.9	15.81	19 17.1	27	16 59 49.18	6.224	22 19 54.3	11.28	18 32.5
28	15 44 46.71	6.227	19 2 38.5	15.49	19 15.7	28	17 2 18.49	6.219	22 24 21.5	10.94	18 31.1
29	15 47 16.22	6.232	19 11 10.3	15.16	19 14.2	29	17 4 47.64	6.211	22 28 40.0	10.60	18 29.6
30	15 49 45.33	6.237	19 19 34.4	14.84	19 12.8	30	17 7 16.63	6.204	22 32 59.3	10.26	18 28.1
31	15 52 15.58	6.240	19 27 50.6	14.51	19 11.3	31	17 9 45.45	6.197	22 36 52.4	9.92	18 26.6
32	15 54 45.32	6.243	-19 35 59.0	20.19	19 9.9	32	17 12 14.08	6.189	-22 40 46.3	9.58	18 25.2
Day of the Month,	1st.	9th.	17th.	25th.		Day of the Month,	3d.	10th.	18th.	26th.	
Polar Semidiameter	" 2.6	" 2.8	" 2.9	" 3.0		Polar Semidiameter	" 3.1	" 3.3	" 3.5	" 3.7	
Horizontal Parallax	4.5	4.7	4.9	5.1		Horizontal Parallax	5.3	5.6	6.0	6.3	



## GREENWICH MEAN TIME.

### MARCH.

### APRIL.

Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.	h. m.	Noon.	Noon.	Noon.	Noon.	Noon.	h. m.
h. m. s.	s.	° ' "	"	h. m.	h. m. s.	s.	° ' "	"	h. m.	h. m. s.	s.
1	17 7 16.63	6.304	-22 32 50.3	10.26	18 28.1	1	18 21 46.51	5.708	-23 39 16.5	1.03	17 40.3
2	17 9 45.46	6.197	22 36 52.4	9.92	18 26.6	2	18 24 3.18	5.682	23 39 38.4	0.80	17 38.6
3	17 12 14.08	6.189	22 40 46.3	9.58	18 25.2	3	18 26 19.23	5.655	23 39 54.9	0.58	17 36.9
4	17 14 42.53	6.181	22 44 32.1	9.24	18 23.7	4	18 28 34.64	5.628	23 40 6.1	0.36	17 35.2
5	17 17 10.77	6.173	22 48 9.9	8.91	18 22.2	5	18 30 49.38	5.600	23 40 12.2	0.15	17 33.5
6	17 19 38.81	6.164	22 51 39.6	8.57	18 20.8	6	18 33 3.44	5.571	23 40 13.3	0.06	17 31.8
7	17 22 6.64	6.154	22 55 1.4	8.24	18 19.3	7	18 35 16.81	5.542	23 40 9.6	0.28	17 30.1
8	17 24 34.24	6.145	22 58 15.2	7.91	18 17.8	8	18 37 29.47	5.512	23 40 1.3	0.44	17 28.4
9	17 27 1.60	6.135	23 1 21.2	7.59	18 16.3	9	18 39 41.38	5.481	23 39 48.5	0.62	17 26.6
10	17 29 28.71	6.124	23 4 19.4	7.26	18 14.8	10	18 41 52.54	5.448	23 39 31.3	0.80	17 24.8
11	17 31 55.55	6.112	23 7 9.8	6.94	18 13.3	11	18 44 2.90	5.415	23 39 9.9	0.97	17 23.1
12	17 34 22.10	6.100	23 9 52.5	6.62	18 11.8	12	18 46 12.45	5.380	23 38 44.6	1.13	17 21.3
13	17 36 48.35	6.087	23 12 27.5	6.30	18 10.3	13	18 48 21.16	5.345	23 38 15.6	1.28	17 19.5
14	17 39 14.27	6.073	23 14 55.0	5.99	18 8.8	14	18 50 28.99	5.308	23 37 43.0	1.42	17 17.7
15	17 41 39.86	6.059	23 17 14.9	5.68	18 7.3	15	18 52 35.93	5.270	23 37 7.2	1.56	17 15.8
16	17 44 5.09	6.044	23 19 27.4	5.37	18 5.8	16	18 54 41.95	5.231	23 36 28.3	1.68	17 14.0
17	17 46 29.95	6.028	23 21 32.5	5.07	18 4.2	17	18 56 47.01	5.191	23 35 46.4	1.80	17 12.1
18	17 48 54.42	6.011	23 23 30.4	4.76	18 2.7	18	18 58 51.10	5.149	23 35 1.9	1.91	17 10.2
19	17 51 18.48	5.994	23 25 21.1	4.47	18 1.1	19	19 0 54.18	5.107	23 34 14.9	2.00	17 8.3
20	17 53 42.11	5.976	23 27 4.7	4.17	17 59.6	20	19 2 56.23	5.063	23 33 25.7	2.09	17 6.4
21	17 56 5.29	5.958	23 28 41.4	3.89	17 58.0	21	19 4 57.22	5.019	23 32 34.4	2.17	17 4.5
22	17 58 28.01	5.937	23 30 11.2	3.60	17 56.5	22	19 6 57.13	4.973	23 31 41.3	2.28	17 2.5
23	18 0 50.25	5.916	23 31 34.2	3.32	17 54.9	23	19 8 55.93	4.927	23 30 46.6	2.31	17 0.5
24	18 3 12.00	5.896	23 32 50.7	3.05	17 53.3	24	19 10 53.63	4.880	23 29 50.6	2.36	16 58.5
25	18 5 33.24	5.874	23 34 0.6	2.78	17 51.7	25	19 12 50.19	4.833	23 28 53.5	2.40	16 56.5
26	18 7 53.95	5.852	23 35 4.1	2.51	17 50.1	26	19 14 45.60	4.784	23 27 55.6	2.43	16 54.5
27	18 10 14.13	5.829	23 36 1.3	2.26	17 48.5	27	19 16 39.85	4.735	23 26 57.1	2.46	16 52.5
28	18 12 33.76	5.806	23 36 52.2	2.00	17 46.9	28	19 18 32.90	4.685	23 25 58.3	2.46	16 50.4
29	18 14 52.82	5.782	23 37 37.1	1.75	17 45.2	29	19 20 24.72	4.633	23 24 59.3	2.46	16 48.3
30	18 17 11.31	5.758	23 38 16.0	1.50	17 43.6	30	19 22 15.29	4.580	23 24 0.4	2.46	16 46.2
31	18 19 29.21	5.733	23 38 49.1	1.26	17 41.9	31	19 24 4.56	4.526	23 23 1.8	2.43	16 44.1
32	18 21 46.51	5.708	-23 39 16.5	1.03	17 40.3	32	19 25 52.52	4.470	-23 22 3.7	2.40	16 41.9

Day of the Month,	5th.	13th.	21st.	29th.	Day of the Month,	6th.	14th.	22d.	30th.
Polar Semidiameter	"	"	"	"	Polar Semidiameter	"	"	"	"
Horizontal Parallax	3.9	4.1	4.4	4.7	Horizontal Parallax	5.1	5.4	5.9	6.4
	6.7	7.1	7.5	8.0		8.6	9.3	10.0	10.8



## GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	19 24 4.56	4.826	23 23 1.8	2.43	16 44.1	1	20 6 37.34	2.062	23 22 10.6	4.29	15 23.9
2	19 25 52.52	4.470	23 22 3.7	2.40	16 41.9	2	20 7 25.53	1.964	23 23 58.3	4.60	15 20.7
3	19 27 39.13	4.414	23 21 6.5	2.36	16 39.7	3	20 8 11.13	1.845	23 25 55.6	5.09	15 17.5
4	19 29 24.37	4.356	23 20 10.4	2.31	16 37.5	4	20 8 54.08	1.733	23 28 2.7	5.49	15 14.2
5	19 31 8.22	4.297	23 19 15.7	2.24	16 35.3	5	20 9 34.33	1.620	23 30 19.4	5.91	15 11.0
6	19 32 50.63	4.237	23 18 22.7	2.17	16 33.1	6	20 10 11.84	1.504	23 32 46.2	6.34	15 7.6
7	19 34 31.59	4.175	23 17 31.6	2.08	16 30.8	7	20 10 46.54	1.386	23 35 23.4	6.78	15 4.2
8	19 36 11.06	4.112	23 16 42.9	1.98	16 28.5	8	20 11 18.38	1.266	23 38 11.2	7.23	15 0.8
9	19 37 48.99	4.048	23 15 56.6	1.87	16 26.1	9	20 11 47.30	1.143	23 41 9.7	7.67	14 57.3
10	19 39 25.34	3.981	23 15 13.3	1.74	16 23.8	10	20 12 13.25	1.018	23 44 19.3	8.13	14 53.8
11	19 41 0.07	3.912	23 14 33.2	1.60	16 21.4	11	20 12 36.19	0.891	23 47 40.2	8.60	14 50.2
12	19 42 33.13	3.842	23 13 56.6	1.46	16 19.0	12	20 12 56.05	0.763	23 51 12.3	9.07	14 46.6
13	19 44 4.48	3.769	23 13 23.8	1.32	16 16.6	13	20 13 12.80	0.633	23 54 55.6	9.54	14 42.9
14	19 45 34.07	3.695	23 12 55.2	1.10	16 14.1	14	20 13 26.41	0.501	23 58 50.1	10.00	14 39.2
15	19 47 1.85	3.619	23 12 31.2	0.90	16 11.6	15	20 13 36.85	0.368	24 2 55.6	10.46	14 35.4
16	19 48 27.79	3.541	23 12 12.0	0.69	16 9.1	16	20 13 44.08	0.234	24 7 12.0	10.91	14 31.5
17	19 49 51.83	3.462	23 11 58.0	0.47	16 6.5	17	20 13 48.08	0.099	24 11 39.1	11.35	14 27.6
18	19 51 13.94	3.380	23 11 49.5	0.23	16 3.9	18	20 13 48.85	0.036	24 16 16.6	11.78	14 23.7
19	19 52 34.06	3.295	23 11 46.8	0.02	16 1.3	19	20 13 46.35	0.172	24 21 4.3	12.20	14 19.7
20	19 53 52.17	3.211	23 11 50.3	0.28	15 58.6	20	20 13 40.59	0.308	24 26 2.0	12.60	14 15.6
21	19 55 8.20	3.124	23 12 0.2	0.53	15 55.9	21	20 13 31.57	0.443	24 31 9.3	13.00	14 11.5
22	19 56 22.13	3.036	23 12 16.9	0.84	15 53.2	22	20 13 19.31	0.578	24 36 25.8	13.37	14 7.3
23	19 57 38.91	2.946	23 12 40.6	1.14	15 50.4	23	20 13 3.81	0.712	24 41 51.1	13.72	14 3.1
24	19 58 43.52	2.854	23 13 11.7	1.44	15 47.6	24	20 12 45.11	0.846	24 47 24.7	14.06	13 58.8
25	19 59 50.90	2.761	23 13 50.2	1.76	15 44.8	25	20 12 23.23	0.977	24 53 6.0	14.37	13 54.5
26	20 0 56.04	2.666	23 14 36.4	2.09	15 41.9	26	20 11 53.21	1.107	24 58 54.5	14.66	13 50.1
27	20 1 58.89	2.570	23 15 30.5	2.43	15 39.0	27	20 11 30.09	1.235	25 4 49.7	14.92	13 45.7
28	20 2 59.42	2.473	23 16 32.9	2.78	15 36.1	28	20 10 58.90	1.363	25 10 50.7	15.15	13 41.2
29	20 3 57.57	2.373	23 17 43.9	3.14	15 33.1	29	20 10 24.69	1.487	25 16 57.1	15.36	13 36.7
30	20 4 53.31	2.271	23 19 3.6	3.51	15 30.0	30	20 9 47.52	1.609	25 23 8.2	15.54	13 32.1
31	20 5 46.58	2.167	23 20 32.4	3.90	15 27.0	31	20 9 7.45	1.729	25 29 23.2	15.69	13 27.5
32	20 6 37.34	2.062	23 22 10.6	4.29	15 23.9	32	20 8 24.55	1.845	25 35 41.6	15.81	13 22.8
Day of the Month,						Day of the Month,					
8th.						1st.					
16th.						9th.					
24th.						17th.					
28th.						25th.					
Polar Semidiameter						Polar Semidiameter					
6.9						9.0					
Horizontal Parallax						Horizontal Parallax					
11.7						15.2					
12.8						16.6					
13.9						18.0					
						19.4					



## GREENWICH MEAN TIME.

GREENWICH MEAN TIME.															
JULY.								AUGUST.							
Day of Month.	Apparent Right Ascension.		Var. of R.A. for 1 Hour.	Apparent Declination.		Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.		Var. of R.A. for 1 Hour.	Apparent Declination.		Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.			Noon.					Noon.			Noon.			
	h.	m.	s.	s.	°	'			"	h.	m.	s.	s.	°	
1	20	9	7.45	1.729	-25	29	23.2	15.69	18	27.5					
2	20	8	24.55	1.845	25	35	41.6	15.81	13	22.8					
3	20	7	38.86	1.969	25	42	2.4	15.90	13	18.1					
4	20	6	50.54	2.069	25	48	24.9	15.93	13	13.3					
5	20	5	59.59	2.175	25	54	48.2	15.97	13	8.6					
6	20	5	6.14	2.278	26	1	11.4	15.98	13	3.7					
7	20	4	10.27	2.375	26	7	33.9	15.90	12	58.8					
8	20	3	12.12	2.468	26	13	54.7	15.81	12	53.9					
9	20	2	11.81	2.555	26	20	12.9	15.69	12	49.0					
10	20	1	9.48	2.636	26	26	27.7	15.53	12	44.0					
11	20	0	5.29	2.710	26	32	38.2	15.33	12	39.0					
12	19	58	59.41	2.777	26	38	43.4	15.08	12	33.9					
13	19	57	52.00	2.837	26	44	42.2	14.80	12	28.9					
14	19	56	43.25	2.889	26	50	33.7	14.47	12	23.8					
15	19	55	33.34	2.933	26	56	16.8	14.11	12	18.7					
16	19	54	22.47	2.968	27	1	50.7	13.70	12	13.6					
17	19	53	10.86	2.995	27	7	14.4	13.26	12	8.5					
18	19	51	58.71	3.013	27	12	27.2	12.78	12	3.3					
19	19	50	46.22	3.021	27	17	28.2	12.28	11	58.2					
20	19	49	33.65	3.020	27	22	16.8	11.75	11	53.1					
21	19	48	21.21	3.011	27	26	52.3	11.19	11	47.9					
22	19	47	9.11	2.993	27	31	14.0	10.61	11	42.8					
23	19	45	57.56	2.965	27	35	21.5	10.00	11	37.7					
24	19	44	46.76	2.930	27	39	14.1	9.38	11	32.6					
25	19	43	36.93	2.885	27	42	51.4	8.74	11	27.5					
26	19	42	28.25	2.833	27	46	18.2	8.07	11	22.4					
27	19	41	20.94	2.772	27	49	19.2	7.40	11	17.4					
28	19	40	15.17	2.704	27	52	9.2	6.73	11	12.4					
29	19	39	11.14	2.628	27	54	43.0	6.06	11	7.4					
30	19	38	9.08	2.544	27	57	0.6	5.39	11	2.5					
31	19	37	9.11	2.453	27	59	2.1	4.71	10	57.6					
32	19	36	11.37	2.357	-28	0	47.3	4.05	10	52.7					
Day of the Month,		3d.	11th.	19th.	27th.	Day of the Month,		4th.	12th.	20th.	28th.				
Polar Semidiameter		" 12.1	" 12.6	" 12.9	" 12.9	Polar Semidiameter		" 12.6	" 12.0	" 11.4	" 10.6				
Horizontal Parallax		20.6	21.5	21.9	21.3	Horizontal Parallax		21.3	20.4	19.3	18.1				



## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.	Noon.	
h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.	
1	19 32 42.68	1.964	26 59 53.5	12.12	8 48.1	1	20 15 27.88	4.806	23 30 10.7	22.82	7 33.1
2	19 33 31.14	2.083	26 54 58.3	12.48	8 44.9	2	20 17 23.92	4.861	23 20 58.5	22.18	7 31.1
3	19 34 22.67	2.209	26 49 54.2	12.85	8 41.9	3	20 19 21.32	4.916	23 11 38.1	22.52	7 29.1
4	19 35 17.20	2.334	26 44 41.4	13.21	8 38.9	4	20 21 20.08	4.972	23 2 9.2	22.89	7 27.2
5	19 36 14.70	2.456	26 39 20.0	13.57	8 36.0	5	20 23 20.00	5.028	22 52 31.9	22.23	7 25.3
6	19 37 15.11	2.577	26 33 49.8	13.94	8 33.0	6	20 25 21.19	5.076	22 42 46.0	22.61	7 23.3
7	19 38 18.38	2.696	26 28 10.9	14.29	8 30.2	7	20 27 23.56	5.125	22 32 51.5	22.95	7 21.4
8	19 39 24.46	2.808	26 22 23.9	14.63	8 27.3	8	20 29 27.07	5.174	22 22 48.5	23.31	7 19.5
9	19 40 33.29	2.923	26 16 28.5	14.99	8 24.5	9	20 31 31.69	5.221	22 12 36.8	23.67	7 17.7
10	19 41 44.82	3.035	26 10 24.9	15.33	8 21.8	10	20 33 37.40	5.267	22 2 16.3	24.04	7 15.9
11	19 42 58.99	3.144	26 4 12.8	15.67	8 19.0	11	20 35 44.19	5.311	21 51 46.9	24.41	7 14.1
12	19 44 15.74	3.251	25 57 52.2	16.04	8 16.5	12	20 37 52.04	5.353	21 41 8.7	24.77	7 12.3
13	19 45 35.03	3.355	25 51 22.8	16.40	8 13.9	13	20 40 0.98	5.391	21 30 21.7	25.14	7 10.5
14	19 46 56.79	3.457	25 44 44.9	16.76	8 11.3	14	20 42 10.80	5.437	21 19 25.9	25.49	7 8.7
15	19 48 20.97	3.557	25 37 58.5	17.11	8 8.8	15	20 44 21.60	5.483	21 8 21.2	25.88	7 7.0
16	19 49 47.51	3.654	25 31 3.5	17.47	8 6.3	16	20 46 33.26	5.529	20 57 7.6	26.24	7 5.2
17	19 51 16.35	3.748	25 24 0.0	17.83	8 3.9	17	20 48 45.73	5.575	20 45 45.4	26.60	7 3.5
18	19 52 47.44	3.841	25 16 47.7	18.19	8 1.5	18	20 50 59.00	5.620	20 34 14.7	26.96	7 1.8
19	19 54 20.72	3.932	25 9 26.8	18.54	7 59.1	19	20 53 18.06	5.661	20 22 35.6	27.31	7 0.1
20	19 55 56.16	4.019	25 1 57.5	18.90	7 56.7	20	20 55 27.87	5.692	20 10 48.0	27.65	6 58.3
21	19 57 33.66	4.104	24 54 19.7	19.25	7 54.4	21	20 57 43.40	5.661	19 58 52.1	28.00	6 56.6
22	19 59 13.15	4.186	24 46 33.4	19.61	7 52.2	22	20 59 59.61	5.669	19 46 47.8	28.34	6 55.0
23	20 0 54.57	4.265	24 38 38.5	19.96	7 50.0	23	21 2 16.46	5.714	19 34 35.4	28.69	6 53.2
24	20 2 37.86	4.341	24 30 35.1	20.32	7 47.8	24	21 4 33.91	5.759	19 22 14.8	29.03	6 51.7
25	20 4 22.98	4.414	24 22 23.1	20.68	7 45.6	25	21 6 51.94	5.792	19 9 46.1	29.36	6 50.0
26	20 6 9.75	4.486	24 14 2.5	21.03	7 43.4	26	21 9 10.51	5.784	18 57 9.4	29.69	6 48.4
27	20 7 58.26	4.555	24 5 33.4	21.39	7 41.2	27	21 11 29.59	5.805	18 44 24.8	29.99	6 46.8
28	20 9 48.38	4.621	23 56 55.7	21.75	7 39.1	28	21 13 49.15	5.826	18 31 32.3	29.35	6 45.2
29	20 11 40.07	4.685	23 48 9.8	22.11	7 37.1	29	21 16 9.18	5.843	18 18 32.1	29.67	6 43.6
30	20 13 33.25	4.746	23 39 14.3	22.47	7 35.1	30	21 18 29.64	5.862	18 5 24.0	29.99	6 42.0
31	20 15 27.88	4.805	23 30 10.7	22.82	7 33.1	31	21 20 50.54	5.879	17 52 8.1	30.32	6 40.4
32	20 17 23.92	4.861	23 20 58.5	23.18	7 31.1	32	21 23 11.84	5.895	17 38 44.5	30.64	6 38.8
Day of the Month,						Day of the Month,					
5th.						7th.					
13th.						15th.					
21st.						23d.					
29th.						31st.					
Polar Semidiameter						Polar Semidiameter					
Horizontal Parallax						Horizontal Parallax					
9.9						7.4					
16.9						12.6					
9.2						6.9					
9.5						6.4					
7.9						6.0					
14.6						10.9					
13.5						10.2					



## GREENWICH MEAN TIME.

## NOVEMBER.

Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.
1	21 23 11.84	5.885	17 38 44.5	33.64	6 38.8
2	21 25 33.52	5.911	17 25 13.3	33.93	6 37.2
3	21 27 55.56	5.925	17 11 34.6	34.27	6 35.6
4	21 30 17.94	5.938	16 57 48.3	34.58	6 34.0
5	21 32 40.65	5.950	16 43 54.6	34.89	6 32.5
6	21 35 3.67	5.963	16 29 53.3	35.20	6 31.0
7	21 37 27.01	5.976	16 15 44.9	35.49	6 29.4
8	21 39 50.65	5.991	16 1 29.6	35.78	6 27.8
9	21 42 14.58	6.002	15 47 7.4	36.06	6 26.3
10	21 44 38.77	6.013	15 32 38.4	36.34	6 24.7
11	21 47 3.22	6.023	15 18 2.8	36.62	6 23.2
12	21 49 27.90	6.033	15 3 20.6	36.89	6 21.7
13	21 51 52.82	6.043	14 48 31.9	37.16	6 20.2
14	21 54 17.96	6.053	14 33 36.8	37.43	6 18.7
15	21 56 43.32	6.060	14 18 35.4	37.69	6 17.1
16	21 59 8.87	6.068	14 3 27.8	37.94	6 15.6
17	22 1 34.61	6.076	13 48 14.1	38.19	6 14.1
18	22 4 0.52	6.085	13 32 54.5	38.43	6 12.6
19	22 6 26.59	6.090	13 17 29.2	38.67	6 11.1
20	22 8 52.81	6.095	13 1 58.4	38.89	6 9.6
21	22 11 19.16	6.100	12 46 22.2	39.13	6 8.1
22	22 13 45.64	6.106	12 30 40.1	39.36	6 6.6
23	22 16 12.25	6.111	12 14 52.7	39.58	6 5.0
24	22 18 38.96	6.116	11 59 0.0	39.80	6 3.6
25	22 21 5.76	6.118	11 43 2.1	40.01	6 2.1
26	22 23 32.63	6.120	11 26 59.2	40.23	6 0.6
27	22 25 59.54	6.123	11 10 51.5	40.43	5 59.1
28	22 28 26.49	6.124	10 54 39.1	40.61	5 57.6
29	22 30 53.49	6.126	10 38 22.3	40.81	5 56.1
30	22 33 20.54	6.128	10 22 1.0	40.97	5 54.6
31	22 35 47.65	6.131	10 5 35.5	41.13	5 53.1
32	22 38 14.82	6.133	9 49 6.0	41.31	5 51.6

## DECEMBER.

Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.
1	22 35 47.65	6.131	10 5 35.5	41.13	5 53.1
2	22 38 14.82	6.133	9 49 6.0	41.31	5 51.6
3	22 40 42.04	6.135	9 32 32.5	41.47	5 50.2
4	22 43 9.31	6.137	9 15 55.2	41.63	5 48.7
5	22 45 36.63	6.139	8 59 14.1	41.78	5 47.2
6	22 48 4.00	6.141	8 42 29.5	41.93	5 45.8
7	22 50 31.43	6.144	8 25 41.4	42.07	5 44.3
8	22 52 58.90	6.146	8 8 49.9	42.21	5 42.8
9	22 55 26.43	6.148	7 51 55.1	42.35	5 41.3
10	22 57 54.00	6.150	7 34 57.1	42.48	5 39.8
11	23 0 21.62	6.152	7 17 56.0	42.61	5 38.4
12	23 2 49.23	6.153	7 0 52.0	42.73	5 36.9
13	23 5 16.98	6.155	6 43 45.2	42.84	5 35.4
14	23 7 44.71	6.156	6 26 35.8	42.94	5 33.9
15	23 10 12.48	6.158	6 9 24.0	43.04	5 32.4
16	23 12 40.29	6.159	5 52 10.0	43.13	5 30.9
17	23 15 8.15	6.161	5 34 53.8	43.21	5 29.5
18	23 17 36.06	6.163	5 17 35.7	43.29	5 28.0
19	23 20 4.01	6.165	5 0 15.7	43.37	5 26.5
20	23 22 31.99	6.167	4 42 53.9	43.44	5 25.0
21	23 25 0.02	6.168	4 25 30.4	43.50	5 23.5
22	23 27 28.07	6.169	4 8 5.7	43.56	5 22.0
23	23 29 56.15	6.170	3 50 39.7	43.60	5 20.6
24	23 32 24.26	6.173	3 33 12.8	43.64	5 19.1
25	23 34 52.41	6.173	3 15 44.9	43.68	5 17.6
26	23 37 20.59	6.175	2 58 16.1	43.71	5 16.2
27	23 39 48.80	6.176	2 40 46.6	43.74	5 14.7
28	23 42 17.04	6.177	2 23 16.4	43.77	5 13.2
29	23 44 45.31	6.178	2 5 45.6	43.79	5 11.8
30	23 47 13.61	6.180	1 48 14.4	43.81	5 10.3
31	23 49 41.94	6.181	1 30 42.8	43.82	5 8.8
32	23 52 10.30	6.182	1 13 11.0	43.84	5 7.3

Day of the Month, 7th. 15th. 23d. 31st.

Polar Semidiameter " 5.6 " 5.8 " 5.0 " 4.7  
Horizontal Parallax 9.6 9.0 8.5 8.0

Day of the Month, 8th. 16th. 24th. 32d.

Polar Semidiameter " 4.5 " 4.2 " 4.0 " 3.8  
Horizontal Parallax 7.6 7.2 6.8 6.5



## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	7 33 13.07	1.383	+22 1 35.0	3.44	12 49.3	1	7 16 8.20	1.202	+22 39 58.3	3.43	10 30.5
2	7 32 39.75	1.392	22 2 57.7	3.44	12 44.9	2	7 15 39.60	1.180	22 40 56.0	3.37	10 26.1
3	7 32 6.21	1.401	22 4 20.3	3.44	12 40.4	3	7 15 11.54	1.158	22 41 52.3	3.31	10 21.7
4	7 31 32.47	1.410	22 5 42.9	3.44	12 35.9	4	7 14 44.03	1.135	22 42 47.2	3.26	10 17.8
5	7 30 58.54	1.417	22 7 5.4	3.43	12 31.4	5	7 14 17.08	1.111	22 43 40.6	3.20	10 12.9
6	7 30 24.45	1.423	22 8 27.6	3.43	12 26.9	6	7 13 50.72	1.088	22 44 32.6	3.14	10 8.5
7	7 29 50.24	1.428	22 9 49.5	3.41	12 22.5	7	7 13 24.96	1.060	22 45 23.2	3.08	10 4.2
8	7 29 15.92	1.432	22 11 11.2	3.40	12 17.9	8	7 12 59.82	1.034	22 46 12.4	3.02	9 59.9
9	7 28 41.52	1.434	22 12 32.5	3.38	12 13.4	9	7 12 35.32	1.006	22 47 0.1	2.96	9 55.6
10	7 28 7.08	1.436	22 13 53.4	3.36	12 8.9	10	7 12 11.47	0.981	22 47 46.4	2.90	9 51.3
11	7 27 32.61	1.436	22 15 13.7	3.34	12 4.4	11	7 11 48.27	0.953	22 48 31.3	2.84	9 47.0
12	7 26 58.14	1.436	22 16 33.5	3.31	11 59.9	12	7 11 25.75	0.924	22 49 14.7	2.78	9 42.7
13	7 26 23.69	1.434	22 17 52.6	3.29	11 55.4	13	7 11 3.93	0.895	22 49 56.6	2.72	9 38.4
14	7 25 49.30	1.432	22 19 11.1	3.25	11 50.9	14	7 10 42.81	0.865	22 50 37.1	2.66	9 34.1
15	7 25 14.98	1.428	22 20 28.9	3.22	11 46.4	15	7 10 22.41	0.836	22 51 16.1	2.60	9 29.8
16	7 24 40.76	1.423	22 21 45.9	3.19	11 41.9	16	7 10 2.74	0.804	22 51 53.6	2.53	9 25.5
17	7 24 6.67	1.417	22 23 2.1	3.16	11 37.4	17	7 9 43.82	0.773	22 52 29.6	2.47	9 21.3
18	7 23 32.73	1.411	22 24 17.5	3.12	11 32.9	18	7 9 25.65	0.741	22 53 4.1	2.41	9 17.1
19	7 22 58.97	1.403	22 25 31.9	3.08	11 28.4	19	7 9 8.24	0.709	22 53 37.1	2.35	9 12.9
20	7 22 25.42	1.396	22 26 45.4	3.04	11 23.9	20	7 8 51.61	0.676	22 54 8.6	2.29	9 8.7
21	7 21 52.10	1.388	22 27 57.9	3.00	11 19.4	21	7 8 35.77	0.643	22 54 38.7	2.22	9 4.5
22	7 21 19.04	1.379	22 29 9.3	2.96	11 14.9	22	7 8 20.73	0.610	22 55 7.3	2.16	9 0.3
23	7 20 46.26	1.360	22 30 19.7	2.91	11 10.4	23	7 8 6.49	0.576	22 55 34.4	2.10	8 56.1
24	7 20 13.79	1.346	22 31 28.9	2.86	11 6.0	24	7 7 53.06	0.542	22 56 0.0	2.04	8 51.9
25	7 19 41.65	1.332	22 32 36.9	2.81	11 1.5	25	7 7 40.46	0.508	22 56 24.2	2.08	8 47.8
26	7 19 9.88	1.316	22 33 43.8	2.76	10 57.0	26	7 7 28.68	0.474	22 56 46.9	2.02	8 43.7
27	7 18 39.50	1.300	22 34 49.5	2.71	10 52.5	27	7 7 17.72	0.439	22 57 8.1	1.96	8 39.6
28	7 18 7.53	1.283	22 35 53.9	2.66	10 48.1	28	7 7 7.60	0.405	22 57 27.8	1.90	8 35.5
29	7 17 36.99	1.263	22 36 57.0	2.61	10 43.7	29	7 6 58.31	0.370	22 57 46.1	1.83	8 31.4
30	7 17 6.91	1.243	22 37 58.8	2.55	10 39.3	30	7 6 49.86	0.335	22 58 3.0	1.77	8 27.3
31	7 16 37.31	1.222	22 38 59.2	2.49	10 34.9	31	7 6 42.25	0.300	22 58 18.4	1.71	8 23.2
32	7 16 8.20	1.202	+22 39 58.3	2.43	10 30.5	32	7 6 35.49	0.265	+22 58 32.4	1.65	8 19.2



## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.	
1	7 6 49.86	0.385	+22 58 3.0	0.67	8 27.3	1	7 9 20.81	0.720	+22 55 16.6	1.11	6 28.1
2	7 6 42.25	0.300	22 58 18.4	0.61	8 23.2	2	7 9 38.45	0.751	22 54 49.3	1.17	6 24.5
3	7 6 35.49	0.265	22 58 32.4	0.55	8 19.2	3	7 9 56.82	0.781	22 54 20.6	1.23	6 20.9
4	7 6 29.57	0.229	22 58 44.9	0.49	8 15.2	4	7 10 15.91	0.811	22 53 50.6	1.28	6 17.3
5	7 6 24.50	0.194	22 58 55.9	0.43	8 11.2	5	7 10 35.72	0.840	22 53 19.3	1.33	6 13.7
6	7 6 20.27	0.159	22 59 5.6	0.37	8 7.2	6	7 10 56.23	0.870	22 52 46.7	1.39	6 10.1
7	7 6 16.88	0.124	22 59 13.9	0.31	8 3.2	7	7 11 17.45	0.899	22 52 12.7	1.45	6 6.5
8	7 6 14.33	0.089	22 59 20.9	0.26	7 59.2	8	7 11 39.37	0.928	22 51 37.3	1.50	6 2.9
9	7 6 12.62	0.054	22 59 26.5	0.20	7 55.2	9	7 12 1.97	0.956	22 51 0.5	1.56	5 59.3
10	7 6 11.75	-0.019	22 59 30.7	0.15	7 51.3	10	7 12 25.25	0.984	22 50 22.3	1.62	5 55.8
11	7 6 11.72	+0.016	22 59 33.5	0.09	7 47.4	11	7 12 49.21	1.012	22 49 42.7	1.68	5 52.3
12	7 6 12.54	0.051	22 59 35.0	+0.03	7 43.5	12	7 13 13.84	1.040	22 49 1.7	1.74	5 48.8
13	7 6 14.19	0.086	22 59 35.0	-0.03	7 39.6	13	7 13 39.13	1.067	22 48 19.3	1.80	5 45.3
14	7 6 16.69	0.121	22 59 33.7	0.08	7 35.7	14	7 14 5.07	1.094	22 47 35.5	1.85	5 41.8
15	7 6 20.00	0.156	22 59 31.0	0.14	7 31.8	15	7 14 31.66	1.121	22 46 50.3	1.91	5 38.3
16	7 6 24.15	0.190	22 59 27.0	0.20	7 27.9	16	7 14 58.89	1.148	22 46 3.7	1.97	5 34.8
17	7 6 29.14	0.225	22 59 21.6	0.26	7 24.1	17	7 15 26.74	1.174	22 45 15.7	2.03	5 31.3
18	7 6 34.93	0.259	22 59 14.9	0.31	7 20.3	18	7 15 55.22	1.200	22 44 26.2	2.09	5 27.8
19	7 6 41.59	0.294	22 59 6.8	0.37	7 16.5	19	7 16 24.31	1.225	22 43 35.3	2.15	5 24.3
20	7 6 49.04	0.328	22 58 57.3	0.42	7 12.7	20	7 16 54.01	1.250	22 42 42.9	2.21	5 20.9
21	7 6 57.31	0.362	22 58 46.4	0.48	7 8.9	21	7 17 24.31	1.275	22 41 49.0	2.27	5 17.5
22	7 7 6.40	0.396	22 58 34.2	0.54	7 5.1	22	7 17 55.21	1.300	22 40 53.7	2.33	5 14.1
23	7 7 16.30	0.430	22 58 20.6	0.60	7 1.3	23	7 18 26.69	1.324	22 39 56.9	2.40	5 10.7
24	7 7 27.01	0.463	22 58 5.7	0.65	6 57.6	24	7 18 58.74	1.348	22 38 58.7	2.46	5 7.3
25	7 7 38.52	0.496	22 57 49.4	0.71	6 53.9	25	7 19 31.36	1.371	22 37 59.0	2.52	5 3.9
26	7 7 50.82	0.529	22 57 31.7	0.76	6 50.2	26	7 20 4.53	1.394	22 36 57.8	2.58	5 0.5
27	7 8 3.90	0.561	22 57 12.6	0.82	6 46.5	27	7 20 38.25	1.416	22 35 55.1	2.64	4 57.1
28	7 8 17.76	0.592	22 56 52.1	0.88	6 42.8	28	7 21 12.50	1.438	22 34 51.0	2.70	4 53.7
29	7 8 32.39	0.625	22 56 30.3	0.94	6 39.1	29	7 21 47.25	1.460	22 33 45.4	2.76	4 50.4
30	7 8 47.78	0.657	22 56 7.1	0.99	6 35.4	30	7 22 22.58	1.482	22 32 38.4	2.82	4 47.0
31	7 9 3.92	0.689	22 55 42.5	1.05	6 31.7	31	7 22 58.40	1.503	22 31 29.8	2.89	4 43.7
32	7 9 20.81	0.720	+22 55 16.6	1.11	6 28.1	32	7 23 34.72	1.524	+22 30 19.7	2.95	4 40.4
Day of the Month,	1st.	11th.	21st.	31st.		Day of the Month,	1st.	11th.	21st.	31st.	
Polar Semidiameter	20."	19."	18."	18."		Polar Semidiameter	18."	17."	17."	16."	
Horizontal Parallax	1.9	1.8	1.7	1.7		Horizontal Parallax	1.7	1.6	1.6	1.5	



## GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"			h. m. s.	s.	° ' "	"	
1	7 22 58.40	1.503	+22 31 29.8	2.89	4 43.7	1	7 45 1.03	2.004	+21 43 22.4	4.88	3 3.8
2	7 23 34.72	1.524	22 30 19.7	2.93	4 40.4	2	7 45 49.25	2.015	21 41 24.3	4.93	3 0.7
3	7 24 11.58	1.544	22 29 8.1	3.01	4 37.1	3	7 46 27.74	2.026	21 39 24.6	5.01	2 57.5
4	7 24 48.83	1.564	22 27 55.0	3.07	4 33.8	4	7 47 26.48	2.036	21 37 23.4	5.06	2 54.4
5	7 25 26.60	1.584	22 26 40.4	3.14	4 30.5	5	7 48 15.48	2.047	21 35 20.6	5.14	2 51.3
6	7 26 4.85	1.603	22 25 24.3	3.20	4 27.2	6	7 49 4.73	2.057	21 33 16.3	5.21	2 48.2
7	7 26 48.56	1.622	22 24 6.7	3.27	4 23.9	7	7 49 54.23	2.067	21 31 10.4	5.27	2 45.1
8	7 27 22.73	1.641	22 22 47.5	3.33	4 20.6	8	7 50 43.97	2.077	21 29 3.0	5.34	2 42.0
9	7 28 2.34	1.660	22 21 26.9	3.39	4 17.3	9	7 51 33.95	2.087	21 26 54.1	5.40	2 38.9
10	7 28 42.40	1.678	22 20 4.8	3.45	4 14.0	10	7 52 24.15	2.096	21 24 43.6	5.47	2 35.8
11	7 29 22.89	1.696	22 18 41.1	3.52	4 10.7	11	7 53 14.57	2.105	21 22 31.6	5.53	2 32.7
12	7 30 3.81	1.714	22 17 15.9	3.58	4 7.5	12	7 54 5.21	2.114	21 20 18.0	5.60	2 29.6
13	7 30 45.15	1.731	22 15 49.1	3.64	4 4.3	13	7 54 56.06	2.123	21 18 2.9	5.66	2 26.5
14	7 31 26.90	1.748	22 14 20.8	3.71	4 1.1	14	7 55 47.11	2.131	21 15 46.2	5.73	2 23.4
15	7 32 9.07	1.765	22 12 50.9	3.78	3 57.9	15	7 56 38.36	2.139	21 13 28.0	5.79	2 20.3
16	7 32 51.64	1.782	22 11 19.4	3.84	3 54.7	16	7 57 29.81	2.147	21 11 8.3	5.85	2 17.3
17	7 33 34.60	1.798	22 9 46.4	3.91	3 51.5	17	7 58 21.44	2.155	21 8 47.1	5.91	2 14.2
18	7 34 17.95	1.814	22 8 11.8	3.97	3 48.3	18	7 59 13.25	2.163	21 6 24.4	5.98	2 11.2
19	7 35 1.67	1.832	22 6 35.6	4.04	3 45.1	19	8 0 5.24	2.170	21 4 0.1	6.04	2 8.1
20	7 35 45.76	1.848	22 4 57.9	4.10	3 41.9	20	8 0 57.40	2.177	21 1 34.4	6.10	2 5.0
21	7 36 30.22	1.860	22 3 18.6	4.17	3 38.7	21	8 1 49.71	2.184	20 59 7.2	6.17	2 2.0
22	7 37 15.04	1.875	22 1 37.7	4.23	3 35.5	22	8 2 42.18	2.190	20 56 38.5	6.23	1 58.9
23	7 38 0.20	1.889	21 59 55.2	4.30	3 32.3	23	8 3 34.80	2.196	20 54 8.4	6.29	1 55.9
24	7 38 45.70	1.903	21 58 11.1	4.36	3 29.1	24	8 4 27.56	2.201	20 51 36.8	6.35	1 52.8
25	7 39 31.54	1.917	21 56 25.5	4.43	3 25.9	25	8 5 20.45	2.207	20 49 3.8	6.41	1 49.7
26	7 40 17.70	1.930	21 54 38.3	4.49	3 22.7	26	8 6 13.48	2.213	20 46 29.3	6.47	1 46.7
27	7 41 4.18	1.943	21 52 49.6	4.55	3 19.5	27	8 7 6.68	2.217	20 43 53.4	6.53	1 43.6
28	7 41 50.97	1.956	21 50 59.3	4.62	3 16.3	28	8 7 59.90	2.223	20 41 16.2	6.59	1 40.6
29	7 42 38.05	1.968	21 49 7.4	4.69	3 13.2	29	8 8 53.28	2.227	20 38 37.6	6.64	1 37.5
30	7 43 25.43	1.980	21 47 14.0	3.75	3 10.1	30	8 9 46.77	2.231	20 35 57.6	6.70	1 34.5
31	7 44 13.09	1.992	21 45 19.0	4.82	3 7.0	31	8 10 40.36	2.235	20 33 16.2	6.76	1 31.4
32	7 45 1.03	2.004	+21 43 22.4	4.88	3 3.8	32	8 11 34.05	2.239	+20 30 33.5	6.81	1 28.4
Day of the Month,						Day of the Month,					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter						Polar Semidiameter					
Horizontal Parallax						Horizontal Parallax					
16.7						15.6					
16.3						15.3					
15.9						15.1					
15.6						14.9					
1.5						1.4					
1.5						1.4					
1.5						1.4					
1.4						1.4					



## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.	
1	8 10 40.36	2.325	+20 33 16.2	6.76	1 31.4	1	8 38 46.49	2.264	+18 59 42.8	8.22	23 54.5
2	8 11 34.05	2.320	20 30 33.5	6.81	1 23.4	2	8 39 40.80	2.262	18 56 25.1	8.26	23 51.4
3	8 12 27.83	2.343	20 27 49.4	6.87	1 25.3	3	8 40 35.05	2.259	18 53 6.6	8.29	23 48.4
4	8 13 21.70	2.246	20 25 4.0	6.92	1 22.3	4	8 41 29.24	2.257	18 49 47.3	8.32	23 45.4
5	8 14 15.66	2.350	20 22 17.2	6.98	1 19.2	5	8 42 23.37	2.254	18 46 27.2	8.35	23 42.3
6	8 15 9.69	2.353	20 19 29.1	7.03	1 16.2	6	8 43 17.48	2.251	18 43 6.4	8.38	23 39.3
7	8 16 3.80	2.366	20 16 39.7	7.09	1 13.2	7	8 44 11.42	2.248	18 39 44.8	8.41	23 36.3
8	8 16 57.98	2.359	20 13 49.0	7.14	1 10.1	8	8 45 5.38	2.246	18 36 22.5	8.44	23 33.2
9	8 17 52.23	2.362	20 10 57.0	7.20	1 7.1	9	8 45 59.17	2.241	18 32 59.5	8.47	23 30.2
10	8 18 46.54	2.364	20 8 3.7	7.25	1 4.1	10	8 46 52.92	2.238	18 29 35.8	8.50	23 27.2
11	8 19 40.90	2.366	20 5 9.1	7.31	1 1.1	11	8 47 46.58	2.234	18 26 11.4	8.53	23 24.1
12	8 20 35.32	2.368	20 2 13.3	7.36	0 58.0	12	8 48 40.15	2.230	18 22 46.4	8.56	23 21.1
13	8 21 29.73	2.370	19 59 16.3	7.41	0 55.0	13	8 49 33.61	2.226	18 19 20.8	8.58	23 18.0
14	8 22 24.29	2.372	19 56 18.0	7.46	0 52.0	14	8 50 26.97	2.221	18 15 54.7	8.60	23 15.0
15	8 23 18.84	2.374	19 53 18.5	7.51	0 49.0	15	8 51 20.21	2.216	18 12 28.1	8.62	23 11.9
16	8 24 13.41	2.376	19 50 17.8	7.56	0 45.9	16	8 52 13.33	2.211	18 9 1.0	8.64	23 8.9
17	8 25 8.01	2.376	19 47 16.0	7.61	0 42.9	17	8 53 6.33	2.206	18 5 33.4	8.66	23 5.8
18	8 26 2.63	2.376	19 44 13.0	7.65	0 39.9	18	8 53 59.20	2.201	18 2 5.4	8.68	23 2.8
19	8 26 57.26	2.377	19 41 8.9	7.70	0 36.9	19	8 54 51.95	2.195	17 58 37.0	8.69	22 59.7
20	8 27 51.91	2.377	19 38 3.8	7.74	0 33.8	20	8 55 44.56	2.189	17 55 8.2	8.71	22 56.7
21	8 28 46.56	2.377	19 34 57.5	7.79	0 30.8	21	8 56 37.03	2.183	17 51 39.1	8.73	22 53.6
22	8 29 41.21	2.377	19 31 50.2	7.83	0 27.8	22	8 57 29.35	2.177	17 48 9.7	8.73	22 50.6
23	8 30 35.85	2.376	19 28 41.8	7.88	0 24.8	23	8 58 21.52	2.170	17 44 40.0	8.74	22 47.5
24	8 31 30.48	2.376	19 25 32.4	7.92	0 21.7	24	8 59 13.52	2.164	17 41 10.1	8.75	22 44.4
25	8 32 25.09	2.375	19 22 22.0	7.96	0 18.7	25	9 0 5.37	2.157	17 37 40.0	8.76	22 41.3
26	8 33 19.68	2.374	19 19 10.6	8.00	0 15.7	26	9 0 57.05	2.150	17 34 9.7	8.77	22 38.2
27	8 34 14.24	2.373	19 15 58.2	8.04	0 12.6	27	9 1 48.56	2.143	17 30 39.2	8.77	22 35.1
28	8 35 8.77	2.371	19 12 44.9	8.08	0 9.6	28	9 2 39.89	2.136	17 27 8.6	8.78	22 32.1
29	8 36 3.26	2.370	19 9 30.7	8.12	0 6.6	29	9 3 31.05	2.128	17 23 37.9	8.78	22 29.0
30	8 36 57.72	2.368	19 6 15.6	8.15	0 3.5	30	9 4 22.02	2.120	17 20 7.2	8.78	22 25.9
31	8 37 52.13	2.366	19 2 59.6	8.19	0 0.5	31	9 5 12.80	2.112	17 16 36.4	8.78	22 22.8
32	8 38 46.49	2.364	+18 59 42.8	8.22	23 54.5	32	9 6 3.39	2.104	+17 13 5.6	8.78	22 19.7
Day of the Month,						Day of the Month,					
	1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.	
Polar Semidiameter	14.9	14.8	14.8	14.7		Polar Semidiameter	14.7	14.8	14.9	15.0	
Horizontal Parallax	1.4	1.4	1.4	1.4		Horizontal Parallax	1.4	1.4	1.4	1.4	



## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"			h. m. s.	s.	° ' "	"	
1	9 6 3.39	2.104	+17 13 5.6	8.78	22 19.7	1	9 29 26.74	1.760	+15 30 42.3	8.03	20 44.9
2	9 6 53.78	2.096	17 9 34.9	8.78	22 16.6	2	9 30 8.81	1.745	15 27 30.2	7.98	20 41.7
3	9 7 43.98	2.088	17 6 4.2	8.78	22 13.5	3	9 30 50.51	1.730	15 24 19.4	7.93	20 38.5
4	9 8 33.97	2.079	17 2 33.5	8.77	22 10.4	4	9 31 31.84	1.714	15 21 9.8	7.87	20 35.2
5	9 9 23.75	2.070	16 59 3.0	8.77	22 7.3	5	9 32 12.80	1.699	15 18 1.6	7.81	20 31.9
6	9 10 13.32	2.061	16 55 32.6	8.76	22 4.2	6	9 32 53.38	1.683	15 14 54.8	7.76	20 28.6
7	9 11 2.67	2.052	16 52 2.4	8.76	22 1.1	7	9 33 33.58	1.667	15 11 49.4	7.69	20 25.4
8	9 11 51.80	2.042	16 48 32.5	8.74	21 58.0	8	9 34 13.40	1.651	15 8 45.6	7.63	20 22.1
9	9 12 40.69	2.033	16 45 2.9	8.73	21 54.9	9	9 34 52.82	1.634	15 5 43.3	7.57	20 18.8
10	9 13 29.35	2.022	16 41 33.5	8.72	21 51.8	10	9 35 31.83	1.617	15 2 42.6	7.50	20 15.5
11	9 14 17.77	2.012	16 38 4.4	8.71	21 48.6	11	9 36 10.43	1.600	14 59 43.5	7.43	20 12.2
12	9 15 5.95	2.002	16 34 35.7	8.69	21 45.4	12	9 36 48.61	1.582	14 56 46.1	7.36	20 8.9
13	9 15 53.87	1.991	16 31 7.5	8.67	21 42.3	13	9 37 26.37	1.564	14 53 50.5	7.29	20 5.6
14	9 16 41.53	1.980	16 27 39.8	8.66	21 39.2	14	9 38 3.69	1.546	14 50 56.7	7.20	20 2.3
15	9 17 29.92	1.969	16 24 12.6	8.63	21 36.1	15	9 38 40.57	1.528	14 48 4.8	7.12	19 59.0
16	9 18 16.05	1.958	16 20 46.0	8.60	21 32.9	16	9 39 17.01	1.509	14 45 14.7	7.04	19 55.7
17	9 19 2.90	1.947	16 17 20.0	8.57	21 29.7	17	9 39 52.99	1.490	14 42 26.6	6.96	19 52.4
18	9 19 49.47	1.935	16 13 54.6	8.54	21 26.5	18	9 40 28.51	1.470	14 39 40.5	6.88	19 49.1
19	9 20 35.75	1.923	16 10 29.9	8.51	21 23.3	19	9 41 3.56	1.451	14 36 56.4	6.80	19 45.7
20	9 21 21.74	1.910	16 7 6.0	8.48	21 20.1	20	9 41 38.14	1.431	14 34 14.5	6.71	19 42.3
21	9 22 7.42	1.897	16 3 42.8	8.45	21 16.9	21	9 42 12.24	1.411	14 31 34.8	6.62	19 38.9
22	9 22 52.80	1.884	16 0 20.5	8.41	21 13.7	22	9 42 45.86	1.391	14 28 57.2	6.52	19 35.5
23	9 23 37.87	1.871	15 56 59.0	8.38	21 10.5	23	9 43 18.99	1.370	14 26 21.8	6.43	19 32.1
24	9 24 22.62	1.858	15 53 38.4	8.34	21 7.3	24	9 43 51.62	1.349	14 23 48.8	6.33	19 28.7
25	9 25 7.05	1.845	15 50 18.7	8.30	21 4.1	25	9 44 23.75	1.328	14 21 18.1	6.23	19 25.3
26	9 25 51.17	1.831	15 46 59.9	8.26	21 0.9	26	9 44 55.38	1.307	14 18 49.7	6.13	19 21.9
27	9 26 34.96	1.818	15 43 42.2	8.22	20 57.7	27	9 45 26.50	1.286	14 16 23.7	6.03	19 18.5
28	9 27 18.42	1.804	15 40 25.5	8.17	20 54.5	28	9 45 57.10	1.264	14 14 0.2	5.93	19 15.1
29	9 28 1.54	1.790	15 37 10.0	8.13	20 51.3	29	9 46 27.18	1.242	14 11 39.2	5.83	19 11.6
30	9 28 44.32	1.775	15 33 55.6	8.08	20 48.1	30	9 46 56.72	1.220	14 9 20.7	5.72	19 8.1
31	9 29 26.74	1.760	15 30 42.3	8.03	20 44.9	31	9 47 25.72	1.197	14 7 4.8	5.61	19 4.6
32	9 30 8.81	1.745	+15 27 30.2	7.98	20 41.7	32	9 47 54.18	1.174	+14 4 51.6	5.50	19 1.1
Day of the Month,						Day of the Month,					
		1st.	11th.	31st.	31st.			1st.	11th.	31st.	31st.
Polar Semidiameter		15.0	15.2	15.4	15.7	Polar Semidiameter		15.7	16.0	16.4	16.9
Horizontal Parallax		1.4	1.4	1.4	1.4	Horizontal Parallax		1.4	1.5	1.5	1.6



## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	9 47 54.18	1.174	+14 4 51.6	5.59	19 1.1	1	9 57 21.63	0.366	+13 22 42.4	1.29	17 12.4
2	9 48 22.09	1.161	14 2 41.1	5.38	18 57.6	2	9 57 30.05	0.356	13 22 13.5	1.12	17 8.6
3	9 48 49.44	1.138	14 0 33.3	5.26	18 54.1	3	9 57 37.73	0.345	13 21 48.6	0.96	17 4.8
4	9 49 16.23	1.104	13 58 28.3	5.14	18 50.6	4	9 57 44.68	0.334	13 21 27.6	0.80	17 1.0
5	9 49 42.44	1.060	13 56 26.2	5.03	18 47.1	5	9 57 50.89	0.323	13 21 10.6	0.63	16 57.2
6	9 50 8.06	1.006	13 54 26.9	4.90	18 43.6	6	9 57 56.36	0.312	13 20 57.5	0.46	16 53.3
7	9 50 33.13	1.032	13 52 30.6	4.78	18 40.1	7	9 58 1.08	0.181	13 20 48.5	0.29	16 49.4
8	9 50 57.59	1.007	13 50 37.3	4.66	18 36.6	8	9 58 5.05	0.160	13 20 48.5	-0.12	16 45.5
9	9 51 21.45	0.982	13 48 47.0	4.53	18 33.1	9	9 58 8.27	0.119	13 20 42.6	+0.08	16 41.6
10	9 51 44.70	0.936	13 46 59.9	4.40	18 29.6	10	9 58 10.74	0.067	13 20 45.8	0.22	16 37.7
11	9 52 7.33	0.880	13 45 15.9	4.26	18 26.0	11	9 58 12.45	0.086	13 20 53.0	0.39	16 33.8
12	9 52 29.34	0.804	13 43 35.2	4.13	18 22.4	12	9 58 13.39	-0.023	13 21 4.3	0.56	16 29.9
13	9 52 50.72	0.876	13 41 57.7	3.99	18 18.8	13	9 58 13.57	+0.000	13 21 19.6	0.72	16 26.0
14	9 53 11.46	0.881	13 40 23.6	3.85	18 15.2	14	9 58 12.99	0.041	13 21 39.0	0.89	16 22.0
15	9 53 31.56	0.834	13 38 52.9	3.71	18 11.6	15	9 58 11.64	0.072	13 22 2.4	1.06	16 18.0
16	9 53 51.01	0.797	13 37 25.5	3.57	18 8.0	16	9 58 9.53	0.104	13 22 30.0	1.23	16 14.0
17	9 54 9.31	0.770	13 36 1.5	3.43	18 4.4	17	9 58 6.67	0.135	13 23 1.6	1.40	16 10.0
18	9 54 27.96	0.743	13 34 41.0	3.29	18 0.8	18	9 58 3.05	0.167	13 23 37.3	1.57	16 6.0
19	9 54 45.44	0.715	13 33 23.9	3.15	17 57.2	19	9 57 58.67	0.198	13 24 17.0	1.73	16 2.0
20	9 55 2.26	0.687	13 32 10.4	3.00	17 53.5	20	9 57 53.54	0.230	13 25 0.6	1.90	15 58.0
21	9 55 18.40	0.650	13 31 0.4	2.84	17 49.8	21	9 57 47.65	0.261	13 25 48.2	2.06	15 54.0
22	9 55 35.86	0.630	13 29 58.9	2.69	17 46.1	22	9 57 41.01	0.292	13 26 39.7	2.23	15 50.0
23	9 55 48.63	0.601	13 28 51.1	2.54	17 42.4	23	9 57 33.33	0.323	13 27 35.0	2.39	15 45.9
24	9 56 2.71	0.572	13 27 51.9	2.39	17 38.7	24	9 57 25.50	0.354	13 28 34.2	2.55	15 41.8
25	9 56 16.09	0.543	13 26 56.4	2.24	17 35.0	25	9 57 16.64	0.385	13 29 37.3	2.71	15 37.7
26	9 56 28.78	0.514	13 26 4.6	2.09	17 31.3	26	9 57 7.04	0.416	13 30 44.2	2.87	15 33.6
27	9 56 40.77	0.486	13 25 16.5	1.93	17 27.6	27	9 56 56.71	0.446	13 31 54.9	3.03	15 29.5
28	9 56 52.05	0.458	13 24 32.2	1.77	17 23.8	28	9 56 45.65	0.476	13 33 9.4	3.19	15 25.4
29	9 57 2.63	0.426	13 23 51.7	1.61	17 20.0	29	9 56 33.88	0.506	13 34 27.6	3.34	15 21.3
30	9 57 12.49	0.396	13 23 15.1	1.45	17 16.2	30	9 56 21.39	0.535	13 35 49.5	3.49	15 17.2
31	9 57 21.63	0.366	13 22 42.4	1.28	17 12.4	31	9 56 8.20	0.564	13 37 14.9	3.63	15 13.1
32	9 57 30.05	0.336	+13 22 13.5	1.13	17 8.6	32	9 55 54.31	0.593	+13 38 43.8	3.77	15 8.9
Day of the Month,						Day of the Month,					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		16.9	17.4	17.9	18.5	Polar Semidiameter		18.5	19.0	19.6	20.1
Horizontal Parallax		1.6	1.6	1.7	1.7	Horizontal Parallax		1.7	1.8	1.8	1.9



## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	O. I. N.	"			h. m. s.	s.	O. I. N.	"	
1	9 52 52.93	-0.420	+14 15 3.7	+2.73	15 8.8	1	9 45 13.75	-0.760	+15 0 2.0	+4.20	12 59.3
2	9 52 42.66	0.435	14 16 10.1	2.80	15 4.7	2	9 44 55.46	0.764	15 1 42.9	4.21	12 55.0
3	9 52 32.03	0.461	14 17 18.2	2.88	15 0.6	3	9 44 37.06	0.769	15 3 24.1	4.22	12 50.8
4	9 52 21.03	0.466	14 18 28.1	2.95	14 56.5	4	9 44 18.55	0.773	15 5 5.6	4.23	12 46.5
5	9 52 9.68	0.480	14 19 39.6	3.01	14 52.3	5	9 43 59.96	0.778	15 6 47.2	4.24	12 42.3
6	9 51 57.98	0.496	14 20 52.8	3.08	14 48.2	6	9 43 41.29	0.779	15 8 28.9	4.24	12 38.1
7	9 51 45.93	0.509	14 22 7.6	3.15	14 44.1	7	9 43 22.55	0.782	15 10 10.6	4.24	12 33.8
8	9 51 33.54	0.523	14 23 24.0	3.22	14 39.9	8	9 43 3.74	0.785	15 11 52.3	4.24	12 29.6
9	9 51 20.31	0.537	14 24 42.1	3.29	14 35.8	9	9 42 44.88	0.786	15 13 33.9	4.23	12 25.3
10	9 51 7.76	0.550	14 26 1.7	3.35	14 31.6	10	9 42 25.99	0.788	15 15 15.4	4.23	12 21.1
11	9 50 54.40	0.563	14 27 22.8	3.41	14 27.5	11	9 42 7.07	0.789	15 16 56.7	4.22	12 16.8
12	9 50 40.72	0.576	14 28 45.3	3.47	14 23.3	12	9 41 48.13	0.789	15 18 37.8	4.21	12 12.6
13	9 50 26.73	0.589	14 30 9.2	3.52	14 19.2	13	9 41 29.18	0.790	15 20 18.6	4.19	12 8.4
14	9 50 12.44	0.601	14 31 34.4	3.58	14 15.0	14	9 41 10.23	0.789	15 21 59.1	4.18	12 4.1
15	9 49 57.86	0.613	14 33 0.9	3.63	14 10.8	15	9 40 51.30	0.788	15 23 39.2	4.16	11 59.9
16	9 49 43.00	0.626	14 34 28.7	3.68	14 6.7	16	9 40 32.40	0.787	15 25 18.8	4.14	11 55.6
17	9 49 27.86	0.636	14 35 57.7	3.73	14 2.5	17	9 40 13.53	0.785	15 26 57.9	4.12	11 51.4
18	9 49 12.45	0.647	14 37 27.9	3.78	13 58.3	18	9 39 54.71	0.783	15 28 36.4	4.09	11 47.2
19	9 48 56.78	0.658	14 38 59.2	3.83	13 54.1	19	9 39 35.94	0.781	15 30 14.4	4.07	11 42.9
20	9 48 40.37	0.668	14 40 31.6	3.87	13 49.9	20	9 39 17.24	0.777	15 31 51.8	4.04	11 38.7
21	9 48 24.72	0.678	14 42 5.0	3.91	13 45.7	21	9 38 58.63	0.773	15 33 28.4	4.01	11 34.4
22	9 48 8.33	0.688	14 43 39.3	3.95	13 41.5	22	9 38 40.11	0.769	15 35 4.2	3.97	11 30.2
23	9 47 51.71	0.697	14 45 14.5	3.98	13 37.3	23	9 38 21.70	0.766	15 36 39.1	3.94	11 25.9
24	9 47 34.88	0.706	14 46 50.5	4.02	13 33.1	24	9 38 3.40	0.760	15 38 13.2	3.90	11 21.7
25	9 47 17.84	0.714	14 48 27.3	4.05	13 28.8	25	9 37 45.22	0.755	15 39 46.4	3.86	11 17.5
26	9 47 0.61	0.722	14 50 4.8	4.08	13 24.6	26	9 37 27.18	0.749	15 41 18.6	3.82	11 13.3
27	9 46 43.19	0.729	14 51 43.0	4.10	13 20.4	27	9 37 9.29	0.742	15 42 49.7	3.77	11 9.0
28	9 46 25.60	0.736	14 53 21.8	4.13	13 16.2	28	9 36 51.55	0.736	15 44 19.7	3.73	11 4.3
29	9 46 7.85	0.743	14 55 1.2	4.15	13 11.9	29	9 36 33.97	0.729	15 45 48.6	3.68	11 0.6
30	9 45 49.96	0.749	14 56 41.1	4.17	13 7.7	30	9 36 16.57	0.721	15 47 16.4	3.63	10 56.3
31	9 45 31.92	0.754	14 58 21.4	4.19	13 3.5	31	9 35 59.36	0.713	15 48 42.9	3.58	10 52.1
32	9 45 13.73	-0.760	+15 0 2.0	+4.20	12 59.3	32	9 35 42.34	-0.705	+15 50 8.2	+3.53	10 47.9
Day of the Month,						Day of the Month,					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		" 9.2	" 9.3	" 9.4	" 9.5	Polar Semidiameter		" 9.5	" 9.5	" 9.5	" 9.4
Horizontal Parallax		1.0	1.0	1.0	1.0	Horizontal Parallax		1.0	1.0	1.0	1.0



## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"			h. m. s.	s.	° ' "	"	
1	9 36 16.57	-0.721	+15 47 16.4	+3.63	10 56.3	1	9 29 29.18	-0.338	+16 19 54.8	+1.45	8 47.7
2	9 35 59.36	0.713	15 48 42.9	3.58	10 52.1	2	9 29 21.50	0.312	16 20 28.7	1.37	8 43.7
3	9 35 42.34	0.705	15 50 8.2	3.53	10 47.9	3	9 29 14.22	0.295	16 21 0.6	1.29	8 39.6
4	9 35 25.53	0.696	15 51 32.2	3.47	10 43.7	4	9 29 7.33	0.279	16 21 30.5	1.20	8 35.6
5	9 35 8.93	0.687	15 52 54.9	3.49	10 39.5	5	9 29 0.84	0.262	16 21 58.3	1.12	8 31.6
6	9 34 52.55	-0.678	15 54 16.3	3.36	10 35.3	6	9 28 54.76	0.245	16 22 24.1	1.03	8 27.6
7	9 34 36.40	-0.668	15 55 36.3	3.30	10 31.1	7	9 28 49.08	0.228	16 22 47.9	0.96	8 23.5
8	9 34 20.49	0.659	15 56 54.8	3.24	10 26.9	8	9 28 43.81	0.211	16 23 9.7	0.87	8 19.5
9	9 34 4.82	0.648	15 58 11.9	3.18	10 22.7	9	9 28 38.95	0.194	16 23 29.5	0.78	8 15.5
10	9 33 49.40	0.637	15 59 27.5	3.12	10 18.5	10	9 28 34.50	0.177	16 23 47.2	0.69	8 11.5
11	9 33 34.24	0.626	16 0 41.6	3.05	10 14.3	11	9 28 30.47	0.160	16 24 2.8	0.61	8 7.5
12	9 33 19.35	0.616	16 1 54.1	2.99	10 10.1	12	9 28 26.86	0.143	16 24 16.4	0.52	8 3.5
13	9 33 4.74	0.605	16 3 5.0	2.92	10 5.9	13	9 28 23.67	0.124	16 24 27.9	0.44	7 59.5
14	9 32 50.42	0.591	16 4 14.3	2.85	10 1.7	14	9 28 20.89	0.107	16 24 37.3	0.36	7 55.5
15	9 32 36.39	0.578	16 5 22.0	2.78	9 57.6	15	9 28 18.53	0.089	16 24 44.6	0.26	7 51.5
16	9 32 22.66	0.566	16 6 28.0	2.71	9 53.4	16	9 28 16.60	0.072	16 24 49.9	0.18	7 47.6
17	9 32 9.24	0.553	16 7 32.3	2.64	9 49.3	17	9 28 15.09	0.054	16 24 53.1	+0.09	7 43.6
18	9 31 56.13	0.540	16 8 34.8	2.57	9 45.2	18	9 28 14.01	0.036	16 24 54.2	0.00	7 39.6
19	9 31 43.34	0.526	16 9 35.6	2.50	9 41.0	19	9 28 13.35	0.019	16 24 53.3	-0.08	7 35.7
20	9 31 30.88	0.513	16 10 34.6	2.42	9 36.9	20	9 28 13.12	-0.001	16 24 50.3	0.17	7 31.8
21	9 31 18.75	0.498	16 11 31.8	2.34	9 32.8	21	9 28 13.32	+0.017	16 24 45.2	0.26	7 27.8
22	9 31 6.96	0.484	16 12 27.1	2.26	9 28.6	22	9 28 13.94	0.033	16 24 38.0	0.34	7 23.9
23	9 30 55.53	0.469	16 13 20.5	2.19	9 24.5	23	9 28 14.99	0.053	16 24 28.7	0.43	7 20.0
24	9 30 44.45	0.454	16 14 12.1	2.11	9 20.4	24	9 28 16.47	0.070	16 24 17.4	0.51	7 16.1
25	9 30 33.73	0.439	16 15 1.8	2.03	9 16.3	25	9 28 18.37	0.088	16 24 4.0	0.60	7 12.2
26	9 30 23.38	0.424	16 15 49.6	1.95	9 12.2	26	9 28 20.70	0.106	16 23 48.6	0.69	7 8.3
27	9 30 13.40	0.408	16 16 35.4	1.87	9 8.1	27	9 28 23.45	0.123	16 23 31.1	0.77	7 4.4
28	9 30 3.79	0.392	16 17 19.2	1.79	9 4.0	28	9 28 26.62	0.141	16 23 11.6	0.85	7 0.5
29	9 29 54.56	0.377	16 18 1.1	1.70	8 59.9	29	9 28 30.21	0.158	16 22 50.1	0.94	6 56.7
30	9 29 45.71	0.361	16 18 41.0	1.62	8 55.9	30	9 28 34.22	0.176	16 22 26.6	1.02	6 52.8
31	9 29 37.25	0.344	16 19 18.9	1.54	8 51.8	31	9 28 38.65	0.193	16 22 1.1	1.10	6 49.0
32	9 29 29.18	-0.328	+16 19 54.8	+1.45	8 47.7	32	9 28 43.49	+0.210	+16 21 33.6	-1.19	6 45.2
Day of the Month,						Day of the Month,					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		9.4	9.4	9.3	9.1	Polar Semidiameter		9.1	9.0	8.8	8.7
Horizontal Parallax		1.0	1.0	1.0	1.0	Horizontal Parallax		1.0	1.0	1.0	0.9



## GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"			h. m. s.	s.	° ' "	"	
1	9 28 38.65	+0.193	+16 22 1.1	-1.10	6 49.0	1	9 34 10.48	+0.090	+15 53 11.8	-3.46	4 52.7
2	9 28 43.49	0.310	16 21 33.6	1.19	6 45.2	2	9 34 26.95	0.093	15 51 47.9	3.33	4 49.0
3	9 28 48.74	0.328	16 21 4.1	1.37	6 41.3	3	9 34 43.74	0.706	15 50 22.4	3.00	4 45.4
4	9 28 54.41	0.346	16 20 32.6	1.33	6 37.5	4	9 35 0.84	0.719	15 48 55.3	2.65	4 41.7
5	9 29 0.48	0.363	16 19 59.2	1.43	6 33.7	5	9 35 18.26	0.732	15 47 26.7	3.73	4 38.1
6	9 29 6.96	0.379	16 19 28.8	1.42	6 29.9	6	9 35 35.99	0.746	15 45 56.5	3.79	4 34.5
7	9 29 13.85	0.395	16 18 46.4	1.60	6 26.0	7	9 35 54.03	0.766	15 44 24.8	3.85	4 30.8
8	9 29 21.14	0.312	16 18 7.1	1.68	6 22.2	8	9 36 12.37	0.770	15 42 51.5	3.92	4 27.2
9	9 29 28.88	0.339	16 17 25.9	1.76	6 18.4	9	9 36 31.01	0.788	15 41 16.7	3.98	4 23.6
10	9 29 36.92	0.345	16 16 42.8	1.84	6 14.6	10	9 36 49.94	0.796	15 39 40.5	4.04	4 20.0
11	9 29 45.40	0.363	16 15 57.8	1.91	6 10.8	11	9 37 9.17	0.807	15 38 2.8	4.30	4 16.3
12	9 29 54.28	0.378	16 15 10.9	1.99	6 7.0	12	9 37 28.68	0.819	15 36 23.6	4.16	4 12.7
13	9 30 3.55	0.395	16 14 22.1	2.07	6 3.2	13	9 37 48.48	0.831	15 34 42.9	4.39	4 9.1
14	9 30 13.22	0.411	16 13 31.5	2.16	5 59.5	14	9 38 8.56	0.842	15 33 0.8	4.39	4 5.5
15	9 30 23.27	0.427	16 12 39.0	2.23	5 55.7	15	9 38 28.92	0.854	15 31 17.2	4.36	4 1.9
16	9 30 33.70	0.443	16 11 44.6	2.30	5 51.9	16	9 38 49.55	0.866	15 29 32.2	4.49	3 58.3
17	9 30 44.52	0.469	16 10 48.4	2.38	5 48.2	17	9 39 10.44	0.876	15 27 45.8	4.46	3 54.7
18	9 30 55.72	0.474	16 9 50.3	2.46	5 44.4	18	9 39 31.60	0.887	15 25 58.1	4.32	3 51.1
19	9 31 7.29	0.490	16 8 50.4	2.43	5 40.7	19	9 39 53.02	0.898	15 24 9.0	4.36	3 47.5
20	9 31 19.23	0.505	16 7 48.7	2.61	5 37.0	20	9 40 14.69	0.908	15 22 19.5	4.63	3 43.9
21	9 31 31.55	0.521	16 6 45.2	2.68	5 33.3	21	9 40 36.62	0.919	15 20 26.7	4.69	3 40.4
22	9 31 44.24	0.536	16 5 39.9	2.76	5 29.5	22	9 40 58.79	0.929	15 18 33.6	4.74	3 36.8
23	9 31 57.29	0.551	16 4 32.7	2.81	5 25.8	23	9 41 21.21	0.939	15 16 39.3	4.79	3 33.3
24	9 32 10.70	0.566	16 3 23.8	2.91	5 22.1	24	9 41 43.87	0.949	15 14 43.7	4.84	3 29.7
25	9 32 24.47	0.581	16 2 13.2	2.98	5 18.4	25	9 42 6.76	0.969	15 12 46.8	4.90	3 26.2
26	9 32 38.59	0.596	16 1 0.9	3.06	5 14.7	26	9 42 29.87	0.988	15 10 48.7	4.96	3 22.7
27	9 32 53.06	0.610	15 59 46.9	3.12	5 11.0	27	9 42 53.21	0.977	15 8 49.4	5.00	3 19.1
28	9 33 7.87	0.624	15 58 31.2	3.19	5 7.3	28	9 43 16.77	0.986	15 6 48.9	5.03	3 15.6
29	9 33 23.02	0.638	15 57 13.8	3.26	5 3.7	29	9 43 40.54	0.998	15 4 47.2	5.09	3 12.1
30	9 33 38.51	0.653	15 55 54.8	3.23	5 0.0	30	9 44 4.52	1.004	15 2 44.4	5.14	3 8.6
31	9 33 54.33	0.666	15 54 34.1	3.40	4 56.3	31	9 44 28.71	1.012	15 0 46.4	5.19	3 5.0
32	9 34 10.48	+0.680	+15 53 11.8	-3.46	4 52.7	32	9 44 53.10	+1.021	+14 58 33.3	-3.24	3 1.5
Day of the Month,						Day of the Month,					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter						Polar Semidiameter					
Horizontal Parallax						Horizontal Parallax					
8.7						8.2					
8.5						8.1					
8.4						7.9					
8.2						7.8					
0.9						0.9					
0.9						0.9					
0.9						0.9					
0.9						0.9					



## GREENWICH MEAN TIME.

## JULY.

## AUGUST.

Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"			h. m. s.	s.	° ' "	"	
1	9 44 28.71	+1.012	+15 0 40.4	-6.19	3 5.0	1	9 58 19.56	+1.194	+13 48 47.8	-6.27	1 16.8
2	9 44 53.10	1.021	14 58 35.3	6.24	3 1.5	2	9 58 48.25	1.197	13 46 17.0	6.29	1 13.4
3	9 45 17.70	1.029	14 56 29.1	6.28	2 58.0	3	9 59 17.01	1.200	13 43 45.7	6.31	1 9.9
4	9 45 42.49	1.037	14 54 21.8	6.33	2 54.5	4	9 59 45.88	1.202	13 41 13.9	6.34	1 6.5
5	9 46 7.47	1.045	14 52 13.5	6.37	2 50.9	5	10 0 14.72	1.205	13 38 41.6	6.36	1 3.1
6	9 46 32.64	1.053	14 50 4.1	6.41	2 47.4	6	10 0 43.67	1.207	13 36 8.8	6.38	0 59.6
7	9 46 57.99	1.060	14 47 58.7	6.46	2 43.9	7	10 1 12.68	1.210	13 33 35.5	6.40	0 56.2
8	9 47 23.51	1.067	14 45 42.2	6.50	2 40.4	8	10 1 41.74	1.212	13 31 1.9	6.41	0 52.7
9	9 47 49.21	1.075	14 43 29.7	6.54	2 36.9	9	10 2 10.85	1.214	13 28 27.7	6.43	0 49.3
10	9 48 15.09	1.083	14 41 16.2	6.58	2 33.4	10	10 2 40.01	1.216	13 25 53.2	6.44	0 45.8
11	9 48 41.14	1.090	14 39 1.8	6.63	2 29.9	11	10 3 9.21	1.218	13 23 18.4	6.46	0 42.3
12	9 49 7.35	1.096	14 36 46.4	6.68	2 26.4	12	10 3 38.46	1.219	13 20 43.3	6.47	0 38.9
13	9 49 33.72	1.102	14 34 30.1	6.70	2 22.9	13	10 4 7.74	1.221	13 18 7.8	6.49	0 35.4
14	9 50 0.24	1.108	14 32 12.8	6.74	2 19.4	14	10 4 37.05	1.223	13 15 32.0	6.50	0 32.0
15	9 50 26.92	1.115	14 29 54.6	6.78	2 15.9	15	10 5 6.38	1.223	13 12 56.0	6.51	0 28.5
16	9 50 53.75	1.121	14 27 35.5	6.81	2 12.4	16	10 5 35.73	1.223	13 10 19.7	6.52	0 25.1
17	9 51 20.72	1.127	14 25 15.6	6.85	2 8.9	17	10 6 5.10	1.224	13 7 43.2	6.53	0 21.7
18	9 51 47.84	1.133	14 22 54.9	6.89	2 5.4	18	10 6 34.49	1.225	13 5 6.5	6.53	0 18.2
19	9 52 15.10	1.139	14 20 33.3	6.92	2 1.9	19	10 7 3.88	1.226	13 2 29.7	6.54	0 14.8
20	9 52 42.48	1.145	14 18 10.9	6.95	1 58.4	20	10 7 33.28	1.226	12 59 52.7	6.54	0 11.3
21	9 53 9.98	1.149	14 15 47.7	6.98	1 54.9	21	10 8 2.68	1.228	12 57 15.6	6.55	0 7.8
22	9 53 37.60	1.153	14 13 23.8	6.01	1 51.4	22	10 8 32.07	1.224	12 54 38.5	6.55	0 4.4
23	9 54 5.34	1.158	14 10 59.2	6.04	1 48.0	23	10 9 1.45	1.224	12 52 1.3	6.55	0 0.9
24	9 54 33.19	1.163	14 8 33.8	6.07	1 44.5	24	10 9 30.82	1.223	12 49 24.0	6.55	23 54.0
25	9 55 1.15	1.167	14 6 7.8	6.10	1 41.0	25	10 10 0.17	1.223	12 46 46.7	6.55	23 50.6
26	9 55 29.22	1.172	14 3 41.1	6.13	1 37.6	26	10 10 29.51	1.223	12 44 9.4	6.55	23 47.2
27	9 55 57.39	1.176	14 1 13.7	6.16	1 34.1	27	10 10 58.82	1.221	12 41 32.2	6.55	23 43.7
28	9 56 25.65	1.179	13 58 45.7	6.18	1 30.7	28	10 11 28.10	1.219	12 38 55.0	6.55	23 40.3
29	9 56 54.00	1.183	13 56 17.1	6.20	1 27.2	29	10 11 57.34	1.218	12 36 17.9	6.54	23 36.9
30	9 57 22.44	1.187	13 53 47.9	6.23	1 23.7	30	10 12 26.55	1.216	12 33 40.9	6.54	23 33.4
31	9 57 50.96	1.190	13 51 18.1	6.25	1 20.3	31	10 12 55.72	1.215	12 31 4.0	6.54	23 30.0
32	9 58 19.56	+1.194	+13 48 47.8	-6.27	1 16.8	32	10 13 24.85	+1.213	+12 28 27.2	-6.53	23 26.5

Day of the Month,	1st.	11th.	21st.	31st.
Polar Semidiameter	" 7.8	" 7.8	" 7.7	" 7.7
Horizontal Parallax	0.9	0.9	0.9	0.9

Day of the Month,	1st.	11th.	21st.	31st.
Polar Semidiameter	" 7.6	" 7.6	" 7.6	" 7.6
Horizontal Parallax	0.8	0.8	0.8	0.8



## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	10 13 24.85	+1.213	+12 28 27.2	-6.53	23 26.5	1	10 27 18.66	+1.077	+11 13 13.5	-5.84	21 42.4
2	10 13 53.93	1.211	12 25 50.6	6.52	23 23.1	2	10 27 44.43	1.070	11 10 53.9	5.80	21 38.9
3	10 14 22.96	1.209	12 23 14.2	6.51	23 19.6	3	10 28 10.03	1.063	11 8 35.2	5.76	21 35.4
4	10 14 51.94	1.206	12 20 38.0	6.51	23 16.1	4	10 28 35.45	1.055	11 6 17.5	5.72	21 31.9
5	10 15 20.86	1.204	12 18 1.9	6.50	23 12.7	5	10 29 0.69	1.048	11 4 0.8	5.67	21 28.3
6	10 15 49.72	1.201	12 15 26.1	6.49	23 9.2	6	10 29 25.74	1.040	11 1 45.2	5.63	21 24.8
7	10 16 18.52	1.198	12 12 50.6	6.47	23 5.8	7	10 29 50.60	1.032	10 59 30.7	5.58	21 21.3
8	10 16 47.24	1.195	12 10 15.4	6.46	23 2.3	8	10 30 15.27	1.024	10 57 17.3	5.53	21 17.8
9	10 17 15.89	1.192	12 7 40.5	6.45	22 58.8	9	10 30 39.74	1.015	10 55 5.0	5.49	21 14.3
10	10 17 44.46	1.189	12 5 6.0	6.43	22 55.4	10	10 31 4.01	1.007	10 52 53.9	5.44	21 10.7
11	10 18 12.95	1.185	12 2 31.9	6.41	22 51.9	11	10 31 28.07	0.998	10 50 44.0	5.39	21 7.2
12	10 18 41.86	1.182	11 59 58.2	6.40	22 48.5	12	10 31 51.92	0.989	10 48 35.3	5.34	21 3.7
13	10 19 9.67	1.178	11 57 24.9	6.38	22 45.0	13	10 32 15.55	0.980	10 46 27.9	5.28	21 0.1
14	10 19 37.88	1.173	11 54 52.1	6.36	22 41.5	14	10 32 38.96	0.971	10 44 21.9	5.22	20 56.6
15	10 20 5.99	1.169	11 52 19.8	6.34	22 38.1	15	10 33 2.14	0.961	10 42 17.2	5.17	20 53.0
16	10 20 34.00	1.165	11 49 48.0	6.31	22 34.6	16	10 33 25.09	0.951	10 40 13.9	5.11	20 49.5
17	10 21 1.90	1.160	11 47 16.8	6.29	22 31.2	17	10 33 47.81	0.942	10 38 12.0	5.06	20 45.9
18	10 21 29.68	1.155	11 44 46.2	6.26	22 27.7	18	10 34 10.29	0.932	10 36 11.5	4.99	20 42.3
19	10 21 57.35	1.150	11 42 16.2	6.24	22 24.2	19	10 34 32.52	0.921	10 34 12.4	4.93	20 38.8
20	10 22 24.89	1.145	11 39 46.8	6.21	22 20.8	20	10 34 54.51	0.911	10 32 14.8	4.87	20 35.2
21	10 22 52.31	1.140	11 37 18.1	6.18	22 17.3	21	10 35 16.24	0.900	10 30 18.7	4.80	20 31.6
22	10 23 19.60	1.134	11 34 50.1	6.15	22 13.8	22	10 35 37.71	0.889	10 28 24.2	4.74	20 28.1
23	10 23 46.75	1.128	11 32 22.8	6.12	22 10.4	23	10 35 58.93	0.878	10 26 31.2	4.68	20 24.5
24	10 24 13.76	1.122	11 29 56.3	6.09	22 6.9	24	10 36 19.98	0.867	10 24 39.7	4.61	20 20.9
25	10 24 40.63	1.117	11 27 30.5	6.06	22 3.4	25	10 36 40.57	0.856	10 22 49.8	4.54	20 17.3
26	10 25 7.36	1.111	11 25 5.5	6.02	21 59.9	26	10 37 0.99	0.845	10 21 1.6	4.47	20 13.7
27	10 25 33.94	1.104	11 22 41.4	5.99	21 56.4	27	10 37 21.13	0.834	10 19 15.1	4.40	20 10.1
28	10 26 0.36	1.098	11 20 18.1	5.95	21 52.9	28	10 37 41.00	0.822	10 17 30.2	4.34	20 6.5
29	10 26 26.62	1.091	11 17 55.7	5.92	21 49.4	29	10 38 0.58	0.810	10 15 47.0	4.26	20 2.9
30	10 26 52.72	1.084	11 15 34.1	5.88	21 45.9	30	10 38 19.88	0.798	10 14 5.6	4.19	19 59.2
31	10 27 18.66	1.077	11 13 13.5	5.84	21 42.4	31	10 38 38.89	0.786	10 12 25.9	4.12	19 55.6
32	10 27 44.43	+1.070	+11 10 53.9	-5.80	21 38.9	32	10 38 57.61	+0.774	+10 10 48.0	-4.04	19 52.0



## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R.A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.	
1 10 38 57.61	+0.774	+10 10 48.0	-4.04	19 52.0	1 10 45 43.38	+0.333	+ 9 37 45.8	-1.33	18 0.6		
2 10 39 16.08	0.761	10 9 11.9	3.97	19 48.3	2 10 45 51.17	0.316	9 37 15.0	1.23	17 56.8		
3 10 39 34.15	0.748	10 7 37.6	3.89	19 44.7	3 10 45 58.56	0.300	9 36 46.6	1.13	17 53.0		
4 10 39 51.96	0.735	10 6 5.2	3.81	19 41.0	4 10 46 5.55	0.283	9 36 20.6	1.03	17 49.1		
5 10 40 9.46	0.723	10 4 34.7	3.73	19 37.4	5 10 46 12.14	0.266	9 35 57.1	0.93	17 45.3		
6 10 40 26.64	0.710	10 3 6.1	3.65	19 33.8	6 10 46 18.33	0.249	9 35 36.1	0.83	17 41.5		
7 10 40 43.51	0.696	10 1 39.4	3.57	19 30.1	7 10 46 24.10	0.232	9 35 17.6	0.72	17 37.6		
8 10 41 0.06	0.683	10 0 14.7	3.49	19 26.5	8 10 46 29.46	0.215	9 35 1.6	0.61	17 33.8		
9 10 41 16.28	0.669	9 58 52.0	3.40	19 22.8	9 10 46 34.41	0.198	9 34 48.2	0.51	17 29.9		
10 10 41 32.17	0.655	9 57 31.4	3.32	19 19.1	10 10 46 38.95	0.180	9 34 37.3	0.40	17 26.1		
11 10 41 47.73	0.641	9 56 12.8	3.23	19 15.4	11 10 46 43.07	0.163	9 34 28.9	0.30	17 22.2		
12 10 42 2.95	0.627	9 54 56.3	3.14	19 11.8	12 10 46 46.78	0.146	9 34 23.0	0.19	17 18.3		
13 10 42 17.82	0.612	9 53 41.9	3.05	19 8.1	13 10 46 50.07	0.128	9 34 19.7	-0.08	17 14.5		
14 10 42 32.35	0.598	9 52 29.7	2.96	19 4.4	14 10 46 52.94	0.111	9 34 19.0	+0.02	17 10.6		
15 10 42 46.53	0.583	9 51 19.6	2.88	19 0.7	15 10 46 55.88	0.093	9 34 20.8	0.13	17 6.7		
16 10 43 0.35	0.569	9 50 11.6	2.79	18 57.0	16 10 46 57.40	0.076	9 34 25.1	0.23	17 2.8		
17 10 43 13.82	0.554	9 49 5.9	2.69	18 53.3	17 10 46 59.01	0.058	9 34 32.0	0.34	16 58.9		
18 10 43 26.93	0.539	9 48 2.4	2.60	18 49.6	18 10 47 0.20	0.041	9 34 41.4	0.44	16 55.0		
19 10 43 39.68	0.524	9 47 1.1	2.51	18 45.8	19 10 47 0.97	0.023	9 34 53.3	0.53	16 51.0		
20 10 43 52.06	0.508	46 2.1	2.42	18 42.1	20 10 47 1.32	+0.006	9 35 7.8	0.66	16 47.1		
21 10 44 4.07	0.493	9 45 5.4	2.32	18 38.4	21 10 47 1.25	-0.012	9 35 24.8	0.76	16 43.2		
22 10 44 15.71	0.477	9 44 10.9	2.22	18 34.6	22 10 47 0.76	0.029	9 35 44.3	0.86	16 39.2		
23 10 44 26.98	0.462	9 43 18.7	2.12	18 30.9	23 10 46 59.86	0.046	9 36 6.2	0.96	16 35.3		
24 10 44 37.87	0.446	9 42 28.8	2.03	18 27.1	24 10 46 58.54	0.064	9 36 30.6	1.07	16 31.3		
25 10 44 48.39	0.430	9 41 41.3	1.93	18 23.4	25 10 46 56.81	0.081	9 36 57.4	1.17	16 27.4		
26 10 44 58.53	0.414	9 40 56.1	1.84	18 19.6	26 10 46 54.66	0.098	9 37 26.7	1.27	16 23.4		
27 10 45 8.28	0.398	9 40 13.2	1.74	18 15.8	27 10 46 52.10	0.115	9 37 58.4	1.37	16 19.4		
28 10 45 17.64	0.382	9 39 32.7	1.64	18 12.0	28 10 46 49.13	0.132	9 38 32.6	1.47	16 15.4		
29 10 45 26.61	0.366	9 38 54.6	1.54	18 8.2	29 10 46 45.75	0.149	9 39 9.2	1.57	16 11.4		
30 10 45 35.19	0.349	9 38 19.0	1.43	18 4.4	30 10 46 41.97	0.166	9 39 48.2	1.67	16 7.4		
31 10 45 43.38	0.332	9 37 45.8	1.33	18 0.6	31 10 46 37.78	0.183	9 40 29.6	1.77	16 3.4		
32 10 45 51.17	+0.316	+ 9 37 15.0	-1.23	17 56.8	32 10 46 33.18	-0.200	+ 9 41 13.3	+1.87	15 59.4		
Day of the Month,	1st.	11th.	21st.	31st.		Day of the Month,	1st.	11th.	21st.	31st.	
Polar Semidiameter	8.1	8.2	8.3	8.5		Polar Semidiameter	8.5	8.6	8.8	8.9	
Horizontal Parallax	0.9	0.9	0.9	0.9		Horizontal Parallax	0.9	1.0	1.0	1.0	



# 242 SUN'S COÖRDINATES, 1860.

Greenwich Mean Noon.		X.	Y.	Z.	Greenwich Mean Noon.		X.	Y.	Z.
Jan. 0	d. 0	+1597535	—8899830	—3862150	Mar. 1	d. 61	+9385395	—2934242	—1273327
1	1	.1769881	.8872256	.3850180	2	62	.9442245	.2783936	.1208103
2	2	.1941645	.8841925	.3837016	3	63	.9496232	.2632799	.1142521
3	3	.2112793	.8808849	.3822662	4	64	.9547346	.2480875	.1076598
4	4	.2283275	.8773038	.3807122	5	65	.9595577	.2328211	.1010354
5	5	+2453038	—8734505	—3790403	6	66	+9640917	—2174854	—0943809
6	6	.2622033	.8693266	.3772512	7	67	.9683358	.2020845	.0876982
7	7	.2790209	.8649336	.3753455	8	68	.9722892	.1866228	.0809890
8	8	.2957517	.8602732	.3733236	9	69	.9759506	.1711047	.0742551
9	9	.3123907	.8553466	.3711861	10	70	.9793191	.1555346	.0674983
10	10	+3289332	—8501549	—3689336	11	71	+9823939	—1399172	—0607209
11	11	.3453744	.8446995	.3665669	12	72	.9851741	.1242567	.0539247
12	12	.3617096	.8389819	.3640866	13	73	.9876589	.1085578	.0471117
13	13	.3779341	.8330038	.3614930	14	74	.9898473	.0928253	.0402841
14	14	.3940427	.8267669	.3587869	15	75	.9917386	.0770634	.0334434
15	15	+4100303	—8202730	—3559691	16	76	+9933320	—0612765	—0265919
16	16	.4258920	.8135238	.3530404	17	77	.9946270	.0454697	.0197316
17	17	.4416228	.8065211	.3500015	18	78	.9956233	.0296479	.0128647
18	18	.4572175	.7992665	.3468533	19	79	.9963205	—0138162	—0059935
19	19	.4726711	.7917624	.3435964	20	80	.9967185	+0020204	+0008797
20	20	+4879784	—7840108	—3402318	21	81	+9968171	+0178569	+0077525
21	21	.5031340	.7760142	.3367610	22	82	.9966165	.0336884	.0146233
22	22	.5181330	.7677754	.3331854	23	83	.9961167	.0495097	.0214895
23	23	.5329706	.7592969	.3295061	24	84	.9953182	.0635156	.0283487
24	24	.5476421	.7505816	.3257238	25	85	.9942218	.0811012	.0351992
25	25	+5621426	—7416328	—3218396	26	86	+9928283	+0968617	+0420385
26	26	.5764676	.7324537	.3178550	27	87	.9911389	.1125925	.0488648
27	27	.5906122	.7230473	.3137720	28	88	.9891549	.1282887	.0556760
28	28	.6045718	.7134165	.3095921	29	89	.9868771	.1439451	.0624699
29	29	.6183426	.7035651	.3053169	30	90	.9843068	.1595569	.0692443
30	30	+6319208	—6934968	—3009477	31	91	+9814454	+1751203	+0759973
Feb. 1	31	.6453023	.6832151	.2964859	Apr. 1	92	.9782942	.1906308	.0827275
2	32	.6584832	.6727233	.2919330	2	93	.9748548	.2060836	.0894329
3	33	.6714597	.6620248	.2872907	3	94	.9711286	.2214751	.0961116
4	34	.6842284	.6511231	.2825604	4	95	.9671170	.2368008	.1027618
5	35	+6967858	—6400217	—2777433	5	96	+9628218	+2520564	+1093817
6	36	.7091287	.6287242	.2728410	6	97	.9582446	.2672379	.1159695
7	37	.7212535	.6172341	.2678554	7	98	.9533867	.2823413	.1225238
8	38	.7331570	.6055549	.2627880	8	99	.9482496	.2973625	.1290425
9	39	.7448362	.5936895	.2576398	9	100	.9428346	.3122974	.1355238
10	40	+7562876	—5816418	—2524122	10	101	+9371432	+3271419	+1419659
11	41	.7675079	.5694157	.2471069	11	102	.9311770	.3418920	.1483670
12	42	.7784937	.5570146	.2417254	12	103	.9249378	.3565428	.1547257
13	43	.7892414	.5444416	.2362695	13	104	.9184273	.3710904	.1610396
14	44	.7997479	.5317005	.2307404	14	105	.9116472	.3855307	.1673067
15	45	+8100098	—5187950	—2251399	15	106	+9045997	+3998593	+1735253
16	46	.8200240	.5057289	.2194695	16	107	.8972864	.4140722	.1796938
17	47	.8297873	.4925063	.2137310	17	108	.8897096	.4281651	.1858100
18	48	.8392963	.4791316	.2079263	18	109	.8818716	.4421332	.1918721
19	49	.8485480	.4656084	.2020572	19	110	.8737747	.4559724	.1978782
20	50	+8575396	—4519411	—1961254	20	111	+8654217	+4696785	+2038264
21	51	.8662680	.4381346	.1901333	21	112	.8568154	.4832472	.2097149
22	52	.8747299	.4241935	.1840827	22	113	.8479587	.4966745	.2155417
23	53	.8829231	.4101219	.1779754	23	114	.8388545	.5099560	.2213050
24	54	.8908453	.3959244	.1718136	24	115	.8295059	.5230879	.2270031
25	55	+8984943	—3816059	—1655995	25	116	+8199163	+5360667	+2326347
26	56	.9058680	.3671711	.1593350	26	117	.8100891	.5488889	.2381982
27	57	.9129644	.3526251	.1530224	27	118	.8000276	.5615507	.2436921
28	58	.9197811	.3379726	.1466638	28	119	.7897354	.5740486	.2491150
29	59	.9263167	.3232184	.1402613	29	120	.7792160	.5863795	.2544653
30	60	+9325698	—3083673	—1338170	30	121	+7684726	+5985401	+2597417



# SUN'S COÖRDINATES, 1860. 243

Greenwich Mean Noon.		X.	Y.	Z.	Greenwich Mean Noon.		X.	Y.	Z.
May	d.				July	d.			
	1	122	+7575086	+6105278		183	-1728938	+9191184	+3988522
	2	123	7463276	.6223378		184	.1895327	.9163524	.3976525
	3	124	.7349329	.6339689		185	.2061182	.9133300	.3963416
	4	125	.7233279	.6454178		186	.2226464	.9100521	.3949198
	5	126	.7115161	.6566818		187	.2391129	.9065194	.3933874
	6	127	+6995007	+6677577		188	-2555130	+9027327	+3917448
	7	128	.6872850	.6786425		189	.2718418	.8986926	.3899922
	8	129	.6748720	.6893338		190	.2880952	.8944002	.3881301
	9	130	.6622651	.6998286		191	.3042694	.8898563	.3861587
	10	131	.6494682	.7101241		192	.3203599	.8850619	.3840784
	11	132	+6364848	+7202171		193	-3363615	+8800179	+3818896
	12	133	.6233181	.7301049		194	.3522698	.8747254	.3795928
	13	134	.6099716	.7397851		195	.3680799	.8691853	.3771886
	14	135	.5964491	.7492540		196	.3837872	.8633996	.3746775
	15	136	.5827544	.7585090		197	.3993871	.8573692	.3720601
	16	137	+5688914	+7675473		198	-4148750	+8510958	+3693371
	17	138	.5548640	.7763661		199	.4302461	.8445795	.3665092
	18	139	.5406767	.7849627		200	.4454952	.8378247	.3635774
	19	140	.5263340	.7933344		201	.4606171	.8308325	.3605425
	20	141	.5118402	.8014786		202	.4756082	.8236051	.3574052
	21	142	+4971998	+8093928		203	-4904640	+8161445	+3541667
	22	143	.4824173	.8170750		204	.5051798	.8084526	.3508281
	23	144	.4674973	.8245233		205	.5197518	.8005316	.3473905
	24	145	.4524444	.8317355		206	.5341757	.7923843	.3438549
	25	146	.4372635	.8387099		207	.5484471	.7840134	.3402224
	26	147	+4219592	+8454447		208	-5625621	+7754216	+3364940
	27	148	.4065362	.8519383		209	.5765170	.7666117	.3326711
	28	149	.3909992	.8581892		210	.5903078	.7575860	.3287550
	29	150	.3753527	.8641961		211	.6039306	.7483480	.3247467
	30	151	.3596014	.8699580		212	.6173820	.7389003	.3206473
June	31	152	+3437496	+8754735	Aug.	213	-6306585	+7292447	+3164580
	1	153	.3278018	.8807412		214	.6437568	.7193836	.3121798
	2	154	.3117623	.8857601		215	.6566739	.7093201	.3078135
	3	155	.2956355	.8905292		216	.6694063	.6990566	.3033600
	4	156	.2794254	.8950474		217	.6819504	.6885955	.2988206
	5	157	+2631366	+8993137		218	-6943027	+6779395	+2941967
	6	158	.2467736	.9033271		219	.7064596	.6670911	.2894894
	7	159	.2303404	.9070865		220	.7184174	.6560530	.2846999
	8	160	.2138412	.9105907		221	.7301724	.6448284	.2798293
	9	161	.1972804	.9138386		222	.7417211	.6334199	.2748784
	10	162	+1806623	+9168291		223	-7530600	+6218300	+2698487
	11	163	.1639917	.9195612		224	.7641855	.6100621	.2647416
	12	164	.1472733	.9220340		225	.7750939	.5981192	.2595585
	13	165	.1305119	.9242464		226	.7857817	.5860047	.2543007
	14	166	.1137123	.9261975		227	.7962453	.5737214	.2489696
	15	167	+0968791	+9278864		228	-8064812	+5612732	+2435667
	16	168	.0800175	.9293124		229	.8164860	.5486637	.2380940
	17	169	.0631324	.9304754		230	.8262564	.5358965	.2325532
	18	170	.0462266	.9313750		231	.8357894	.5229758	.2269458
	19	171	.0293114	.9320105		232	.8450820	.5099053	.2212735
	20	172	+0123860	+9323815		233	-8541313	+4966888	+2155377
	21	173	-.0045421	.9324881		234	.8629345	.4833302	.2097404
	22	174	.0214678	.9323308		235	.8714891	.4698337	.2038836
	23	175	.0383862	.9319102		236	.8797930	.4562035	.1979691
	24	176	.0552924	.9312264		237	.8878438	.4424436	.1919983
	25	177	-.0721813	+9302796		238	-8956391	+4285580	+1859730
	26	178	.0890484	.9290705		239	.9031767	.4145507	.1798952
	27	179	.1058890	.9276000		240	.9104549	.4004263	.1737666
	28	180	.1226984	.9258686		241	.9174718	.3861880	.1675885
	29	181	.1394719	.9238775		242	.9242256	.3718397	.1613628
	30	182	.1562054	.9216271		243	.9307144	.3573857	.1550911
	31	183	-.1728938	+9191184		244	-9369364	+3428294	+1487749



# 244 SUN'S COÖRDINATES, 1860.

Greenwich Mean Noon.		X.	Y.	Z.	Greenwich Mean Noon.		X.	Y.	Z.
Sept. 1	d.				Nov. 1	d.			
	245	-.9428897	+3281752	+1424161		306	-.7671871	-.5765040	-.2601719
	2	.9485725	.3134267	.1360163		2	.7558414	.5885752	.2554107
	3	.9539831	.2985876	.1295770		3	.7443163	.6004693	.2605726
	4	.9591196	.2836618	.1231000		4	.7325649	.6121824	.2655561
	5	.9639802	.2686533	.1165870		5	.7205902	.6237106	.2706595
	6	.9685631	+2535660	+1100396		6	.7083951	-.6350502	-.2755810
	7	.9728665	.2384043	.1034597		7	.6959829	.6461974	.2804187
	8	.9768885	.2231725	.0968491		8	.6833569	.6571483	.2851711
	9	.9806273	.2078743	.0902096		9	.6705206	.6678993	.2898367
	10	.9840813	.1925144	.0835433		10	.6574782	.6784466	.2944138
	11	.9872490	+1770970	+0768521		11	.6442335	-.6887866	-.2989008
	12	.9901288	.1616267	.0701381		12	.6307905	.6989153	.3032961
	13	.9927194	.1461083	.0634034		13	.6171533	.7088296	.3075981
	14	.9950195	.1305468	.0566498		14	.6033283	.7185259	.3118052
	15	.9970281	.1149468	.0498793		15	.5893140	.7280007	.3159161
16	260	-.9987444	+0993126	+0430945	16	321	-.5751208	-.7372509	-.3199295
	17	1.0001676	.0836498	.0362974		17	.5607512	.7462738	.3238442
	18	1.0012970	.0679532	.0294901		18	.5462098	.7550663	.3276588
	19	1.0021321	.0522575	.0226747		19	.5315016	.7636253	.3313722
	20	1.0026729	.0365375	.0158532		20	.5166315	.7719486	.3349834
	21	-1.0029192	+0208081	+0090277		21	.5016038	-.7800339	-.3384913
	22	1.0028710	+0050736	+0022004		22	.4864232	.7878788	.3418950
	23	1.0025285	-.0106609	-.0046270		23	.4710945	.7954810	.3451936
	24	1.0018920	.0263909	.0114524		24	.4556222	.8028383	.3483861
	25	1.0009617	.0421117	.0182737		25	.4400111	.8099486	.3514715
	26	.9997380	-.0578184	-.0250890		26	.4242660	-.8168098	-.3544489
	27	.9982213	.0735071	.0318966		27	.4083912	.8234200	.3573175
	28	.9964118	.0891734	.0386947		28	.3923914	.8297771	.3600766
	29	.9943099	.1048134	.0454814		29	.3762710	.8358795	.3627253
	30	.9919161	.1204224	.0522546		30	.3600344	.8417254	.3652626
Oct. 1	275	-.9892309	-.1359960	-.0590127	Dec. 1	336	-.3436863	-.8473128	-.3676878
	2	.9862548	.1515301	.0657537		2	.3272313	.8526396	.3699999
	3	.9829882	.1670196	.0724757		3	.3106741	.8577039	.3721980
	4	.9794316	.1824606	.0791769		4	.2940197	.8625039	.3742812
	5	.9755854	.1978492	.0858555		5	.2772730	.8670378	.3762490
	6	-.9714501	-.2131808	-.0925093		6	.2604390	-.8713035	-.3781006
	7	.9670263	.2284509	.0991363		7	.2435227	.8752993	.3798349
	8	.9623146	.2436543	.1057345		8	.2265292	.8790239	.3814511
	9	.9573160	.2587861	.1123018		9	.2094639	.8824759	.3829487
	10	.9520312	.2738420	.1188360		10	.1923324	.8856530	.3843271
	11	-.9464614	-.2888176	-.1253352		11	.1751400	-.8885540	-.3855857
	12	.9406081	.3037079	.1317972		12	.1578923	.8911780	.3867240
	13	.9344726	.3185079	.1382199		13	.1405951	.8935241	.3877415
	14	.9280560	.3332125	.1446012		14	.1232543	.8955914	.3886379
	15	.9213603	.3478168	.1509389		15	.1058756	.8973792	.3894129
16	290	-.9143877	-.3623164	-.1572310	16	351	-.0884647	-.8988867	-.3900663
	17	.9071402	.3767069	.1634753		17	.0710275	.9001138	.3905981
	18	.8996198	.3909833	.1696700		18	.0535694	.9010602	.3910081
	19	.8918287	.4051409	.1758131		19	.0360962	.9017254	.3912963
	20	.8837695	.4191753	.1819029		20	.0186133	.9021098	.3914627
	21	-.8754446	-.4330820	-.1879374		21	-.0011260	-.9022135	-.3915076
	22	.8668569	.4468573	.1939145		22	+.0163607	.9020373	.3914311
	23	.8580094	.4604968	.1998325		23	.0338408	.9015809	.3912332
	24	.8489049	.4739965	.2056898		24	.0513079	.9008450	.3909141
	25	.8395459	.4873525	.2114849		25	.0687577	.8998300	.3904740
	26	-.8299352	-.5005612	-.2172163		26	+.0861856	-.8985362	-.3899130
	27	.8200755	.5136185	.2228821		27	.1035867	.8969641	.3892313
	28	.8099694	.5265208	.2284807		28	.1209556	.8951142	.3884292
	29	.7996197	.5392640	.2340106		29	.1382876	.8929869	.3875067
	30	.7890292	.5518448	.2394701		30	.1555774	.8905828	.3864640
	31	-.7782007	-.5642594	-.2448578		31	+.1728198	-.8879026	-.3853015



# MOON'S LONGITUDE, &c., 1860. .245

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JANUARY.		FEBRUARY.		MARCH.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	10 55 27.8	+4 30 18.9	57 10 43.8	+5 5 43.9	79 24 25.6	+4 5 16.3
1.5	17 3 16.2	4 45 47.9	63 48 44.2	4 53 35.3	86 10 5.1	3 40 31.8
2.0	23 15 39.3	4 58 8.8	70 33 24.3	4 37 13.4	93 1 58.1	3 12 15.7
2.5	29 33 10.7	5 7 6.0	77 24 56.1	4 16 39.0	100 0 14.1	2 40 43.7
3.0	35 56 20.8	5 12 24.5	84 23 23.6	3 51 57.5	107 4 55.6	2 6 16.3
3.5	42 25 35.4	5 13 50.2	91 28 41.7	3 23 20.1	114 15 56.4	1 29 20.2
4.0	49 1 14.6	5 11 10.5	98 40 35.0	2 51 4.3	121 33 0.1	0 50 27.5
4.5	55 43 31.8	5 4 15.0	105 58 37.5	2 15 34.4	128 55 39.6	+0 10 16.2
5.0	62 32 32.3	4 52 56.3	113 22 12.3	1 37 22.0	136 23 16.9	-0 30 30.3
5.5	69 28 12.3	4 37 11.9	120 50 31.9	0 57 5.6	143 55 2.2	1 11 5.0
6.0	76 30 18.3	4 17 1.7	128 22 39.4	+0 15 29.4	151 29 55.9	1 50 38.6
6.5	83 38 27.3	3 52 35.8	135 57 30.1	-0 26 37.7	159 6 49.3	2 28 21.9
7.0	90 52 6.1	3 24 8.2	143 33 53.5	1 8 24.3	166 44 27.7	3 3 27.3
7.5	98 10 32.6	2 52 0.9	151 10 36.0	1 48 58.1	174 21 32.9	3 35 11.6
8.0	105 32 56.4	2 16 42.9	158 46 23.3	2 27 30.0	181 56 45.9	4 2 57.9
8.5	112 58 21.4	1 38 50.3	166 20 3.8	3 3 15.3	189 28 51.5	4 26 17.1
9.0	120 25 47.0	0 59 3.9	173 50 30.4	3 35 34.5	196 56 40.0	4 44 48.7
9.5	127 54 11.3	+0 18 9.7	181 16 43.8	4 3 54.9	204 19 10.9	4 58 20.9
10.0	135 22 32.2	-0 23 4.7	188 37 53.8	4 27 52.4	211 35 34.1	5 6 51.0
10.5	142 49 50.3	1 3 51.2	195 53 19.9	4 47 11.6	218 45 12.3	5 10 23.2
11.0	150 15 11.0	1 43 23.1	203 2 33.4	5 1 44.0	225 47 40.9	5 9 8.3
11.5	157 37 45.0	2 20 57.0	210 5 16.7	5 11 28.3	232 42 47.5	5 3 22.0
12.0	164 56 51.3	2 55 54.5	217 1 21.8	5 16 29.2	239 30 30.7	4 53 23.4
12.5	172 11 56.6	3 27 42.6	223 50 49.2	5 16 54.9	246 10 59.4	4 39 34.2
13.0	179 22 34.6	3 55 54.3	230 33 47.3	5 12 57.4	252 44 31.1	4 22 17.2
13.5	186 28 27.2	4 20 8.9	237 10 31.9	5 4 53.5	259 11 30.3	4 1 55.8
14.0	193 29 23.9	4 40 11.5	243 41 23.0	4 52 59.6	265 32 26.6	3 38 53.1
14.5	200 25 20.0	4 55 52.8	250 6 44.7	4 37 34.2	271 47 53.6	3 13 31.7
15.0	207 16 17.0	5 7 8.7	256 27 3.5	4 18 56.2	277 58 27.1	2 46 13.6
15.5	214 2 20.2	5 13 59.1	262 42 47.4	3 57 25.0	284 4 44.8	2 17 20.1
16.0	220 43 38.3	5 16 27.9	268 54 25.1	3 33 20.6	290 7 24.3	1 47 11.5
16.5	227 20 32.6	5 14 41.9	275 2 25.6	3 7 2.5	296 7 3.3	1 16 7.4
17.0	233 52 45.9	5 8 50.8	281 7 16.9	2 38 50.8	302 4 18.4	0 44 27.0
17.5	240 21 2.1	4 59 6.6	287 9 26.4	2 9 5.2	307 59 44.2	-0 12 29.6
18.0	246 45 35.4	4 45 43.1	293 9 19.9	1 38 5.6	313 53 53.8	+0 19 27.4
18.5	253 6 10.2	4 28 55.7	299 7 21.6	1 6 11.8	319 47 17.6	0 51 5.4
19.0	259 23 30.7	4 9 1.6	305 3 54.1	0 33 43.8	325 40 23.7	1 22 6.6
19.5	265 37 40.8	3 46 18.7	310 59 18.2	-0 1 1.2	331 33 37.5	1 52 13.0
20.0	271 48 54.0	3 21 6.2	316 53 53.3	+0 31 36.1	337 27 21.4	2 21 7.1
20.5	277 57 23.4	2 53 44.0	322 47 57.2	1 3 48.7	343 21 55.3	2 48 31.4
21.0	284 3 21.4	2 24 32.6	328 41 46.5	1 35 17.3	349 17 36.8	3 14 8.8
21.5	290 7 0.6	1 53 53.1	334 35 37.0	2 5 43.2	355 14 41.0	3 37 42.8
22.0	296 8 33.4	1 22 6.8	340 29 43.7	2 34 47.9	1 13 20.8	3 58 57.6
22.5	302 8 12.4	0 49 34.7	346 24 21.3	3 2 13.7	7 13 47.3	4 17 37.8
23.0	308 6 11.0	-0 16 38.3	352 19 44.5	3 27 43.3	13 16 10.3	4 33 29.5
23.5	314 2 43.0	+0 16 21.8	358 16 8.2	3 51 1.1	19 20 38.4	4 46 20.0
24.0	319 58 3.7	0 49 5.3	4 13 48.1	4 11 52.4	25 27 19.7	4 55 57.8
24.5	325 52 29.6	1 21 12.6	10 13 0.7	4 30 3.3	31 36 22.1	5 2 13.4
25.0	331 46 18.7	1 52 24.8	16 14 3.5	4 45 20.3	37 47 54.3	5 4 58.9
25.5	337 39 50.7	2 22 23.6	22 17 15.3	4 57 30.9	44 2 5.3	5 4 8.1
26.0	343 33 27.3	2 50 51.8	28 22 56.5	5 6 24.8	50 19 4.8	4 59 37.1
26.5	349 27 31.7	3 17 32.9	34 31 28.6	5 11 52.3	56 39 3.9	4 51 23.7
27.0	355 22 29.4	3 42 11.0	40 43 14.3	5 13 45.1	63 2 15.3	4 39 28.6
27.5	1 18 47.6	4 4 31.5	46 58 37.7	5 11 56.0	69 28 53.2	4 23 54.7
28.0	7 16 55.4	4 24 19.8	53 18 3.4	5 6 19.6	75 59 12.8	4 4 47.2
28.5	13 17 23.0	4 41 22.0	59 41 56.6	4 56 52.0	82 33 30.3	3 42 14.2
29.0	19 20 42.2	4 55 25.0	66 10 42.3	4 43 31.5	89 12 2.1	3 16 26.9
29.5	25 27 25.2	5 6 15.7	72 44 44.6	4 26 18.5	95 55 4.6	2 47 39.2
30.0	31 38 5.0	5 13 42.0	79 24 25.6	4 5 16.3	102 42 52.9	2 16 9.1
30.5	37 53 14.1	5 17 32.1	86 10 5.1	3 40 31.8	109 35 40.8	1 42 17.6
31.0	44 13 24.1	5 17 35.3	93 1 58.1	3 12 15.7	116 33 36.4	1 6 30.3
31.5	50 39 4.9	+5 13 41.9	100 0 14.1	+2 40 43.7	123 36 46.2	+0 29 16.5



# 246. MOON'S LONGITUDE, &c., 1860.

FOR GREENWICH MEAN NOON AND MIDNIGHT.						
Day of Month.	APRIL.		MAY.		JUNE.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	130 45 6.5	—0 8 50.7	169 44 8.6	—3 28 1.1	222 53 34.2	—5 1 48.9
1.5	137 58 28.9	0 47 14.3	177 1 16.1	3 54 0.0	229 53 41.9	4 53 23.7
2.0	145 16 34.1	1 25 14.1	184 19 51.3	4 16 12.7	236 50 43.3	4 40 40.8
2.5	152 38 53.1	2 2 8.0	191 39 9.4	4 34 14.0	243 44 7.7	4 23 57.8
3.0	160 4 46.5	2 37 12.7	198 58 19.7	4 47 43.9	250 33 28.1	4 3 36.3
3.5	167 33 24.8	3 9 45.7	206 16 28.0	4 56 29.1	257 18 21.9	3 40 1.1
4.0	175 3 49.4	3 39 6.8	213 32 38.5	5 0 23.1	263 58 32.4	3 13 38.8
4.5	182 34 54.4	4 4 40.2	220 45 56.0	4 59 26.5	270 33 48.6	2 44 57.3
5.0	190 5 29.0	4 25 55.9	227 55 28.6	4 53 46.7	277 4 5.7	2 14 25.1
5.5	197 34 20.6	4 42 31.1	235 0 29.9	4 43 37.4	283 29 25.4	1 42 30.2
6.0	205 0 18.2	4 54 11.3	242 0 20.8	4 29 17.4	289 49 55.5	1 9 39.8
6.5	212 22 15.0	5 0 50.2	248 54 30.8	4 11 9.9	296 5 49.3	0 36 19.7
7.0	219 39 11.9	5 2 29.8	255 42 39.0	3 49 40.6	302 17 25.3	—0 2 54.0
7.5	226 50 19.3	4 59 19.1	262 24 33.7	3 25 17.2	308 25 6.8	+0 30 14.7
8.0	233 54 58.9	4 51 33.5	269 0 13.2	2 58 28.1	314 29 20.5	1 2 45.8
8.5	240 52 44.3	4 39 33.1	275 29 44.2	2 29 41.4	320 30 37.0	1 34 20.4
9.0	247 43 21.2	4 23 41.6	281 53 21.3	1 59 24.3	326 29 29.2	2 4 41.0
9.5	254 26 46.8	4 4 24.5	288 11 26.1	1 28 2.6	332 26 32.1	2 33 31.6
10.0	261 3 8.6	3 42 8.4	294 24 25.6	0 56 0.7	338 22 22.8	3 0 37.3
10.5	267 32 43.0	3 17 19.8	300 32 51.7	—0 23 41.0	344 17 39.0	3 25 44.1
11.0	273 55 54.4	2 50 24.8	306 37 19.7	+0 8 35.3	350 12 59.0	3 48 38.7
11.5	280 13 12.7	2 21 48.1	312 38 27.7	0 40 29.3	356 9 0.7	4 9 8.5
12.0	286 25 12.5	1 51 53.2	318 36 55.3	1 11 42.8	2 6 21.7	4 27 1.1
12.5	292 32 32.0	1 21 2.3	324 33 23.2	1 41 58.9	8 5 38.3	4 42 4.5
13.0	298 35 51.1	0 49 36.1	330 28 32.3	2 11 2.0	14 7 25.0	4 54 7.0
13.5	304 35 51.0	—0 17 54.2	336 33 3.1	2 38 36.9	20 12 13.8	5 2 57.5
14.0	310 33 13.3	+0 13 44.9	342 17 35.1	3 4 28.8	26 20 34.1	5 8 25.3
14.5	316 28 38.8	0 45 3.6	348 12 46.2	3 28 23.3	32 32 51.5	5 10 20.7
15.0	322 22 47.1	1 15 44.9	354 9 11.9	3 50 6.5	38 49 27.8	5 8 35.1
15.5	328 16 16.3	1 45 32.3	0 7 25.4	4 9 24.4	45 10 40.1	5 3 1.6
16.0	334 9 41.9	2 14 9.4	6 7 56.5	4 26 3.4	51 36 40.3	4 53 35.5
16.5	340 3 36.8	2 41 20.3	12 11 11.9	4 39 50.2	58 7 35.0	4 40 14.9
17.0	345 58 31.1	3 6 49.1	18 17 33.9	4 50 32.1	64 43 25.1	4 23 1.2
17.5	351 54 51.4	3 30 20.1	24 27 21.4	4 57 57.3	71 24 5.4	4 2 0.0
18.0	357 53 1.3	3 51 37.8	30 40 48.1	5 1 55.1	78 9 25.4	3 37 21.0
18.5	3 53 20.5	4 10 27.3	36 58 3.6	5 2 16.3	84 59 9.0	3 9 18.8
19.0	9 56 5.2	4 26 34.0	43 19 12.9	4 58 54.1	91 52 55.6	2 38 12.9
19.5	16 1 28.2	4 39 44.3	49 44 16.3	4 51 43.9	98 50 20.6	2 4 27.9
20.0	22 9 38.9	4 49 45.7	56 13 10.5	4 40 44.1	105 50 56.5	1 28 32.7
20.5	28 20 43.3	4 56 27.1	62 45 47.8	4 25 56.8	112 54 13.9	0 51 0.3
21.0	34 34 44.9	4 59 39.4	69 21 58.2	4 27 27.4	119 59 42.7	+0 12 26.9
21.5	40 51 44.8	4 59 15.4	76 1 28.9	3 45 25.5	127 6 52.7	—0 26 29.3
22.0	47 11 42.3	4 55 10.2	82 44 6.1	3 20 4.7	134 15 14.5	1 5 8.8
22.5	53 34 35.5	4 47 21.7	89 29 35.2	2 51 42.7	141 24 30.3	1 42 52.1
23.0	60 0 22.3	4 35 50.8	96 17 41.8	2 20 40.8	148 33 44.2	2 19 1.0
23.5	66 29 0.4	4 20 41.2	103 8 12.5	1 47 23.8	155 43 2.7	2 52 59.0
24.0	73 0 28.6	4 1 59.9	110 0 55.2	1 12 19.7	162 51 54.1	3 24 12.8
24.5	79 34 46.8	3 39 57.0	116 55 39.4	+0 35 59.1	169 59 59.0	3 52 12.6
25.0	86 11 56.1	3 14 45.6	123 52 15.8	—0 1 5.5	177 7 0.0	4 16 32.8
25.5	92 51 59.5	2 46 42.0	130 50 37.2	0 8 20.3	184 12 40.9	4 36 52.0
26.0	99 35 1.2	2 16 5.6	137 50 36.8	1 15 10.5	191 16 46.8	4 52 53.8
26.5	106 21 7.0	1 43 18.9	144 52 8.5	1 51 1.1	198 19 4.0	5 4 26.4
27.0	113 10 23.3	1 8 46.8	151 55 5.9	2 25 17.7	205 19 19.3	5 11 23.1
27.5	120 2 56.4	+0 32 57.0	158 59 21.3	2 57 27.0	212 17 19.4	5 13 41.7
28.0	126 58 52.0	—0 3 40.0	166 4 43.5	3 26 57.2	219 12 52.0	5 11 24.7
28.5	133 58 13.8	0 40 31.9	173 11 6.6	3 53 19.0	226 5 44.5	5 4 39.0
29.0	141 1 2.5	1 17 4.4	180 18 9.5	4 16 6.1	232 55 44.8	4 53 35.7
29.5	148 7 14.7	1 52 41.8	187 25 35.7	4 34 55.7	239 42 41.2	4 38 29.4
30.0	155 16 41.3	2 26 47.8	194 33 2.7	4 49 39.3	246 26 32.9	4 19 38.3
30.5	162 29 6.9	2 58 46.0	201 40 4.5	4 59 33.2	253 6 39.7	3 57 23.4
31.0	169 44 8.6	3 28 1.1	208 46 11.9	5 4 59.0	259 43 23.1	3 32 8.0
31.5	177 1 16.1	—3 54 0.0	215 50 52.9	—5 5 43.4	266 16 26.4	—3 4 17.2



# MOON'S LONGITUDE, &c., 1860. 247

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.		AUGUST.		SEPTEMBER.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	259 43 23.1	—3 32 8.0	306 46 32.9	+0 26 1.3	351 29 21.0	+3 57 18.1
1.5	266 16 26.4	3 4 17.2	312 51 31.3	0 59 24.9	357 24 43.3	4 16 33.8
2.0	272 45 45.0	2 34 17.3	318 54 19.4	1 31 55.8	3 20 10.3	4 33 2.9
2.5	279 11 16.4	2 2 35.3	324 55 10.6	2 3 13.9	9 15 56.9	4 46 35.5
3.0	285 33 1.2	1 29 38.1	330 54 19.4	2 33 0.8	15 12 19.0	4 57 3.2
3.5	291 51 2.9	0 55 52.4	336 52 1.9	3 0 59.2	21 9 33.9	5 4 19.0
4.0	298 5 28.3	—0 21 44.0	342 48 35.3	3 26 53.6	27 8 0.6	5 8 17.3
4.5	304 16 27.2	+0 12 22.3	348 44 18.7	3 50 30.0	33 7 59.9	5 8 53.6
5.0	310 24 12.6	0 46 3.6	354 39 33.0	4 11 35.5	39 9 54.7	5 6 4.9
5.5	316 29 0.8	1 18 58.4	0 34 40.7	4 29 58.7	45 14 9.5	4 59 49.2
6.0	322 31 10.9	1 50 46.5	6 30 6.1	4 45 29.3	51 21 11.1	4 50 6.1
6.5	328 31 4.7	2 21 9.5	12 26 15.3	4 57 58.1	57 31 27.7	4 36 56.4
7.0	334 29 7.0	2 49 51.0	18 23 36.4	5 7 16.8	63 45 38.9	4 20 22.5
7.5	340 25 44.8	3 16 35.5	24 22 38.8	5 13 18.2	70 3 44.9	4 0 28.7
8.0	346 21 27.3	3 41 9.2	30 23 53.3	5 15 55.7	76 26 46.3	3 37 21.2
8.5	352 16 45.4	4 3 19.3	36 27 51.6	5 15 3.8	82 55 3.0	3 11 8.7
9.0	358 12 11.8	4 22 53.8	42 35 6.0	5 10 37.7	89 29 3.3	2 42 2.8
9.5	4 8 20.3	4 29 41.7	48 46 9.4	5 2 33.9	96 9 12.6	2 10 18.4
10.0	10 5 45.5	4 53 32.7	55 1 33.6	4 50 50.2	102 55 52.2	1 36 14.5
10.5	16 5 2.5	5 4 16.8	61 21 49.6	4 35 26.0	109 49 17.8	1 0 14.1
11.0	22 6 46.3	5 11 44.8	67 47 26.3	4 16 22.8	116 49 37.7	+0 22 45.1
11.5	28 11 31.2	5 15 48.0	74 18 49.7	3 53 44.8	123 56 51.0	—0 15 39.9
12.0	34 19 50.3	5 16 18.3	80 56 21.7	3 27 39.4	131 10 46.6	0 54 23.4
12.5	40 32 15.1	5 13 8.6	87 40 19.0	2 58 17.7	138 31 1.3	1 32 44.3
13.0	46 49 14.3	5 6 13.0	94 30 52.1	2 25 55.6	145 56 59.4	2 9 57.9
13.5	53 11 13.4	4 55 27.4	101 28 3.7	1 50 54.0	153 27 52.5	2 45 18.3
14.0	59 38 33.9	4 40 49.6	108 31 47.7	1 13 39.2	161 2 40.1	3 17 59.8
14.5	66 11 32.6	4 22 20.6	115 41 48.6	+0 34 43.1	168 40 11.5	3 47 18.9
15.0	72 50 20.4	4 0 4.6	122 57 40.4	—0 5 17.0	176 19 7.8	4 12 37.1
15.5	79 35 1.6	3 34 9.7	130 18 47.0	0 45 39.1	183 58 5.6	4 33 22.2
16.0	86 25 33.7	3 4 49.1	137 44 22.2	1 25 37.7	191 35 40.3	4 49 10.4
16.5	93 21 46.7	2 32 21.2	145 13 30.9	2 4 25.3	199 10 30.2	4 59 46.7
17.0	100 23 22.8	1 57 9.8	152 45 10.2	2 41 14.3	206 41 20.3	5 5 5.8
17.5	107 29 56.6	1 19 44.4	160 18 12.1	3 15 19.3	214 7 5.1	5 5 11.2
18.0	114 40 55.9	0 40 39.5	167 51 25.8	3 45 58.8	221 26 51.3	5 0 14.3
18.5	121 55 42.0	+0 0 34.4	175 23 40.1	4 12 37.2	228 39 58.7	4 50 33.1
19.0	129 13 31.0	—0 39 48.5	182 58 47.2	4 34 46.2	235 46 1.1	4 36 30.5
19.5	136 33 35.0	1 19 44.6	190 20 44.5	4 52 5.5	242 44 45.5	4 18 32.9
20.0	143 55 4.1	1 58 28.9	197 43 37.2	5 4 23.2	249 36 10.9	3 57 8.4
20.5	151 17 7.6	2 35 17.6	205 1 39.9	5 11 35.3	256 30 26.8	3 32 46.1
21.0	158 38 55.8	3 9 30.0	212 14 17.6	5 13 45.2	262 57 51.2	3 5 54.8
21.5	165 59 41.1	3 40 29.3	219 21 5.9	5 11 2.2	269 28 48.8	2 37 2.6
22.0	173 18 40.1	4 7 44.2	226 21 50.8	5 3 41.1	275 53 48.8	2 6 36.6
22.5	180 35 13.9	4 30 49.6	233 16 27.5	4 52 0.2	282 13 23.9	1 35 2.1
23.0	187 48 49.5	4 49 26.5	240 4 59.1	4 36 20.8	288 28 8.8	1 2 43.3
23.5	194 58 59.4	5 3 22.4	246 47 35.8	4 17 6.2	294 38 38.8	—0 30 3.0
24.0	202 5 22.7	5 12 31.1	253 24 33.1	3 54 40.6	300 45 28.9	+0 2 37.4
24.5	209 7 43.8	5 16 51.9	259 56 10.5	3 29 28.8	306 49 13.3	0 34 57.7
25.0	216 5 52.6	5 16 29.2	266 22 50.1	3 1 55.7	312 50 24.6	1 6 38.8
25.5	222 59 43.8	5 11 31.9	272 44 56.0	2 32 26.2	318 49 33.6	1 37 22.4
26.0	229 49 15.9	5 2 12.4	279 2 53.1	2 1 24.6	324 47 8.5	2 6 51.2
26.5	236 34 30.9	4 48 46.6	285 17 6.3	1 29 14.8	330 43 35.2	2 34 48.7
27.0	243 15 33.3	4 31 32.8	291 28 0.3	0 56 20.1	336 39 16.9	3 0 59.1
27.5	249 52 29.7	4 10 51.5	297 35 58.7	—0 23 3.1	342 34 34.1	3 25 7.6
28.0	256 25 28.3	3 47 4.7	303 41 23.9	+0 10 14.1	348 29 44.8	3 47 0.3
28.5	262 54 38.4	3 20 35.7	309 44 36.5	0 43 10.3	354 25 5.0	4 6 24.2
29.0	269 20 9.7	2 51 48.6	315 45 55.8	1 15 25.1	0 20 48.3	4 23 7.4
29.5	275 42 12.6	2 21 8.4	321 45 39.6	1 46 38.8	6 17 6.9	4 36 59.4
30.0	282 0 57.6	1 49 0.0	327 44 4.2	2 16 32.9	12 14 11.4	4 47 51.0
30.5	288 16 35.3	1 15 48.4	333 41 24.6	2 44 49.7	18 12 12.1	4 55 34.4
31.0	294 29 16.5	0 41 58.3	339 37 55.1	3 11 12.8	24 11 18.6	5 0 3.4
31.5	300 39 11.9	—0 7 54.0	345 33 49.5	+3 35 26.9	30 11 40.8	+5 1 13.5



# 248 MOON'S LONGITUDE, &c., 1860.

FOR GREENWICH MEAN NOON AND MIDNIGHT.						
Day of Month.	OCTOBER.		NOVEMBER.		DECEMBER.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	24 11 18.6	+5 0 3.4	70 12 35.9	+3 35 28.2	105 44 32.8	+0 41 31.0
1.5	30 11 40.8	5 1 13.5	76 31 22.7	3 11 0.0	112 24 36.3	+0 5 31.7
2.0	36 13 28.5	4 59 1.9	82 52 47.1	2 43 56.9	119 7 24.1	-0 30 49.1
2.5	42 16 53.5	4 53 27.5	89 17 0.2	2 14 35.5	125 52 56.8	1 7 0.8
3.0	48 22 8.7	4 44 31.0	95 44 15.0	1 43 14.5	132 41 15.8	1 42 31.7
3.5	54 29 28.9	4 32 14.8	102 14 46.7	1 10 14.6	139 32 22.7	2 16 49.8
4.0	60 39 11.1	4 16 43.2	108 48 52.0	0 35 58.8	146 26 18.9	2 49 23.2
4.5	66 51 34.6	3 58 2.3	115 26 48.1	+0 0 52.2	153 23 4.7	3 19 40.5
5.0	73 7 0.6	3 36 20.1	122 8 52.3	-0 34 38.2	160 22 38.7	3 47 11.4
5.5	79 25 52.3	3 11 46.5	128 55 21.3	1 10 3.4	167 24 56.9	4 11 27.4
6.0	85 48 34.8	2 44 33.6	135 46 29.7	1 44 52.6	174 29 51.8	4 32 2.0
6.5	92 15 34.2	2 14 55.8	142 42 28.5	2 18 33.5	181 37 11.3	4 48 31.9
7.0	98 47 17.0	1 43 9.9	149 43 23.8	2 50 32.5	188 46 38.2	5 0 37.3
7.5	105 24 9.2	1 9 35.7	156 49 15.1	3 20 15.3	195 57 50.2	5 8 2.8
8.0	112 6 35.5	+0 34 35.7	163 59 54.3	3 47 8.1	203 10 19.6	5 10 38.1
8.5	118 54 56.5	-0 1 24.1	171 15 4.1	4 10 38.1	210 23 33.5	5 8 18.3
9.0	125 49 29.6	0 37 54.3	178 34 17.0	4 30 14.5	217 36 54.3	5 1 4.7
9.5	132 50 25.0	1 14 22.3	185 56 55.2	4 45 30.2	224 49 40.9	4 49 4.9
10.0	139 57 44.6	1 50 12.3	193 22 11.0	4 56 3.2	232 1 9.8	4 32 32.8
10.5	147 11 20.6	2 24 45.6	200 49 8.1	5 1 37.5	239 10 37.1	4 11 47.8
11.0	154 30 53.4	2 57 22.3	208 16 42.9	5 2 4.4	246 17 19.5	3 47 14.9
11.5	161 55 50.9	2 27 21.6	215 43 47.6	4 57 23.2	253 20 36.6	3 19 23.4
12.0	169 25 27.9	3 54 3.7	223 9 12.8	4 47 41.1	260 19 52.2	2 48 45.5
12.5	176 58 46.8	4 16 51.9	230 31 50.2	4 33 13.3	267 14 35.3	2 15 55.6
13.0	184 34 38.9	4 35 14.2	237 50 36.7	4 14 21.9	274 4 21.4	1 41 29.0
13.5	192 11 46.8	4 48 45.2	245 4 36.4	3 51 34.7	280 48 53.0	1 6 0.5
14.0	199 48 47.6	4 57 7.4	252 13 2.8	3 25 23.6	287 27 59.8	-0 30 3.6
14.5	207 24 16.7	5 0 12.5	259 15 19.9	2 56 23.2	294 1 39.0	+0 5 50.2
15.0	214 56 52.1	4 58 1.4	266 11 3.0	2 25 9.2	300 29 54.6	0 41 12.0
15.5	222 25 17.6	4 50 43.9	272 59 59.0	1 52 17.1	306 52 57.1	1 15 35.9
16.0	229 48 26.7	4 38 37.8	279 42 5.6	1 18 20.8	313 11 2.8	1 48 38.9
16.5	237 5 24.9	4 22 7.2	286 17 30.7	0 43 51.9	319 24 33.3	2 20 1.0
17.0	244 15 31.4	4 1 40.9	292 46 30.4	-0 9 19.6	325 33 54.4	2 49 24.8
17.5	251 18 19.1	3 37 50.8	299 9 27.6	+0 24 49.8	331 39 35.3	3 16 35.6
18.0	258 13 34.9	3 11 10.1	305 26 51.3	0 58 12.9	337 42 8.2	3 41 20.6
18.5	265 1 18.3	2 42 12.0	311 39 14.7	1 30 29.1	343 42 7.6	4 3 28.8
19.0	271 41 39.9	2 11 28.5	317 47 14.1	2 1 20.0	349 40 9.4	4 22 51.0
19.5	278 14 59.5	1 39 30.2	323 51 27.9	2 30 29.5	355 36 50.3	4 39 19.0
20.0	284 41 44.2	1 6 45.4	329 52 36.0	2 57 43.3	1 32 47.7	4 52 45.5
20.5	291 2 26.3	0 33 40.1	335 51 18.0	3 22 48.7	7 28 38.6	5 3 3.9
21.0	297 17 42.2	-0 0 37.8	341 48 13.2	3 45 33.9	13 24 59.2	5 10 8.6
21.5	303 28 10.7	+0 31 59.7	347 43 59.9	4 5 48.2	19 22 24.6	5 13 54.5
22.0	309 34 31.5	1 3 52.9	353 39 15.2	4 23 21.7	25 21 28.3	5 14 17.1
22.5	315 37 24.9	1 34 43.8	359 34 33.6	4 38 5.3	31 22 41.8	5 11 12.9
23.0	321 37 30.0	2 4 15.9	5 30 27.5	4 49 50.5	37 26 33.9	5 4 89.3
23.5	327 35 24.8	2 32 13.8	11 27 26.6	4 58 29.5	43 33 30.9	4 54 35.1
24.0	333 31 45.3	2 58 23.1	17 25 57.3	5 3 55.2	49 43 55.4	4 41 0.8
24.5	339 27 5.4	3 22 30.5	23 26 22.6	5 6 1.5	55 58 6.1	4 23 58.8
25.0	345 21 56.0	3 44 23.1	29 29 2.2	5 4 43.6	62 16 18.2	4 3 34.1
25.5	351 16 45.2	4 3 49.0	35 34 12.6	4 59 58.1	68 38 42.2	3 39 54.5
26.0	357 11 57.9	4 20 36.8	41 42 6.6	4 51 43.4	75 5 24.1	3 13 11.1
26.5	3 7 55.9	4 34 36.2	47 52 53.6	4 40 0.0	81 36 25.7	2 43 38.4
27.0	9 4 57.9	4 45 37.7	54 6 39.8	4 24 50.8	88 11 44.1	2 11 34.9
27.5	15 3 19.4	4 53 32.9	60 23 28.7	4 6 21.2	94 51 12.2	1 37 22.7
28.0	21 3 13.3	4 58 14.8	66 43 21.0	3 44 39.6	101 34 39.1	1 1 27.9
28.5	27 4 49.7	4 59 37.8	73 6 15.4	3 19 57.4	108 21 50.1	+0 24 19.8
29.0	33 8 16.6	4 57 38.1	79 32 9.4	2 52 29.3	115 12 28.1	-0 13 29.4
29.5	39 13 40.4	4 52 13.7	86 0 59.6	2 22 32.7	122 6 13.9	0 51 25.1
30.0	45 21 6.0	4 43 24.9	92 32 42.3	1 50 28.3	129 2 46.6	1 28 51.2
30.5	51 30 37.8	4 31 14.1	99 7 14.2	1 16 39.2	136 1 44.2	2 5 11.2
31.0	57 42 20.1	4 15 45.9	105 44 32.8	0 41 31.0	143 2 44.7	2 39 49.1
31.5	63 56 17.6	+3 57 7.5	112 24 36.3	+0 5 31.7	150 5 26.4	-3 19 10.0



**ASTRONOMICAL EPHEMERIS**

**FOR THE**

**MERIDIAN OF WASHINGTON.**



Sidereal O <sup>h</sup> .	Apparent Obliquity.	Equation of Equinoxes.		Precession of Equinoxes in Longitude.	The Sun's		Mean Longitude of Moon's Ascending Node.
		In Longitude.	In R. A.		Aberration.	Hor. Parallax.	
1860.	23° 27'						
0	32° 10'	+12.90	+0.79	0.00	-20.80	8.72	312° 49.1
10	32.13	13.42	0.82	1.37	20.79	8.72	312 17.4
20	32.21	13.83	0.84	2.74	20.77	8.71	311 45.7
30	32.32	14.10	0.86	4.12	20.75	8.70	311 14.1
40	32.44	14.21	0.87	5.49	20.72	8.69	310 42.4
50	32.55	14.17	0.87	6.86	20.67	8.67	310 10.7
60	32.61	13.99	0.86	8.23	20.62	8.65	309 39.0
70	32.63	13.71	0.84	9.60	20.57	8.63	309 7.3
80	32.58	13.38	0.82	10.98	20.51	8.61	308 35.6
90	32.46	13.05	0.80	12.35	20.45	8.58	308 3.9
100	32.29	12.78	0.79	13.72	20.40	8.56	307 32.2
110	32.07	12.60	0.77	15.09	20.34	8.53	307 0.5
120	31.81	12.54	0.77	16.47	20.29	8.51	306 28.8
130	31.55	12.62	0.78	17.84	20.24	8.49	305 57.2
140	31.30	12.83	0.79	19.21	20.19	8.47	305 25.5
150	31.08	13.16	0.80	20.58	20.16	8.46	304 53.8
160	30.90	13.58	0.83	21.95	20.13	8.45	304 22.1
170	30.77	14.05	0.86	23.33	20.12	8.44	303 50.4
180	30.70	14.53	0.89	24.70	20.11	8.44	303 18.7
190	30.70	14.98	0.92	26.07	20.11	8.44	302 47.0
200	30.73	15.34	0.95	27.44	20.12	8.44	302 15.3
210	30.81	15.60	0.95	28.81	20.14	8.45	301 43.6
220	30.90	15.73	0.96	30.19	20.17	8.46	301 11.9
230	31.00	15.73	0.96	31.56	20.21	8.48	300 40.3
240	31.07	15.59	0.95	32.93	20.25	8.50	300 8.6
250	31.11	15.34	0.94	34.31	20.30	8.52	299 36.9
260	31.09	15.01	0.92	35.68	20.35	8.54	299 5.2
270	31.01	14.66	0.90	37.05	20.41	8.57	298 33.5
280	30.87	14.32	0.88	38.42	20.47	8.59	298 1.8
290	30.67	14.06	0.86	39.79	20.53	8.61	297 30.1
300	30.42	13.90	0.85	41.16	20.59	8.64	296 58.4
310	30.15	13.88	0.85	42.54	20.64	8.66	296 26.7
320	29.87	14.02	0.86	43.91	20.68	8.68	295 55.0
330	29.60	14.31	0.88	45.28	20.73	8.70	295 23.4
340	29.38	14.73	0.90	46.65	20.76	8.71	294 51.7
350	29.23	15.24	0.93	48.02	20.78	8.71	294 20.0
360	29.12	15.78	0.96	49.40	20.79	8.72	293 48.3
370	29.09	+16.29	+1.00	50.77	-20.79	8.72	293 16.6
Mean Obliquity, 1860.0, . . . . . 23° 27' 26.35 Precession for 1860.5, . . . . . 50.2547 Log. Precession in a Sidereal Day, . . . . . 9.13739 Log. Precession in a Solar Day, . . . . . 9.13858							Daily Motion. 3.169



## FOR WASHINGTON MEAN MIDNIGHT.

## LOGARITHMS FOR CORRECTING THE PLACES OF THE FIXED STARS.

Date.	A.	B.	C.	D.	Date.	A.	B.	C.	D.
Jan. 1	-0.55752	+1.30239	+9.41226	-0.75969	Mar. 1	-1.25107	+0.80299	+9.64651	-0.80183
2	0.59517	1.30080	9.41874	0.75983	2	1.25348	0.77906	9.64870	0.80216
3	0.62967	1.29908	9.42504	0.76001	3	1.25574	0.75360	9.65087	0.80245
4	0.66150	1.29720	9.43120	0.76022	4	1.25786	0.72643	9.65301	0.80271
5	0.69103	1.29518	9.43724	0.76048	5	1.25983	0.69733	9.65512	0.80293
6	-0.71854	+1.29301	+9.44317	-0.76079	6	-1.26166	+0.66602	+9.65721	-0.80310
7	0.74428	1.29069	9.44900	0.76115	7	1.26335	0.63214	9.65927	0.80323
8	0.76846	1.28822	9.45473	0.76156	8	1.26491	0.59527	9.66132	0.80332
9	0.79123	1.28560	9.46035	0.76201	9	1.26633	0.55486	9.66335	0.80336
10	0.81273	1.28283	9.46586	0.76250	10	1.26761	0.51017	9.66536	0.80337
11	-0.83308	+1.27990	+9.47128	-0.76302	11	-1.26875	+0.46023	+9.66734	-0.80332
12	0.85239	1.27681	9.47660	0.76357	12	1.26976	0.40366	9.66930	0.80323
13	0.87074	1.27356	9.48182	0.76416	13	1.27084	0.33851	9.67124	0.80310
14	0.88822	1.27016	9.48694	0.76479	14	1.27138	0.26171	9.67317	0.80293
15	0.90469	1.26658	9.49197	0.76545	15	1.27199	0.16819	9.67508	0.80271
16	-0.92081	+1.26283	+9.49692	-0.76614	16	-1.27247	+0.04878	+9.67699	-0.80244
17	0.93603	1.25892	9.50178	0.76686	17	1.27282	9.88346	9.67888	0.80213
18	0.95061	1.25483	9.50654	0.76761	18	1.27303	9.61313	9.68077	0.80177
19	0.96457	1.25057	9.51121	0.76839	19	1.27312	+8.74868	9.68265	0.80136
20	0.97796	1.24612	9.51580	0.76919	20	1.27307	-9.47424	9.68451	0.80090
21	-0.99083	+1.24150	+9.52031	-0.77001	21	-1.27290	-9.81411	+9.68637	-0.80040
22	1.00318	1.23669	9.52473	0.77085	22	1.27259	0.00224	9.68821	0.79986
23	1.01505	1.23168	9.52907	0.77172	23	1.27216	0.13922	9.69006	0.79928
24	1.02648	1.22647	9.53334	0.77260	24	1.27159	0.23308	9.69190	0.79865
25	1.03748	1.22107	9.53753	0.77350	25	1.27090	0.31426	9.69374	0.79797
26	-1.04806	+1.21547	+9.54164	-0.77442	26	-1.27007	-0.38247	+9.69558	-0.79724
27	1.05826	1.20965	9.54567	0.77534	27	1.26912	0.44127	9.69741	0.79646
28	1.06809	1.20361	9.54961	0.77627	28	1.26803	0.49289	9.69924	0.79564
29	1.07756	1.19735	9.55347	0.77721	29	1.26681	0.53889	9.70108	0.79478
30	1.08670	1.19088	9.55728	0.77816	30	1.26546	0.58033	9.70291	0.79387
31	-1.09551	+1.18417	+9.56102	-0.77911	31	-1.26398	-0.61803	+9.70475	-0.79291
Feb. 1	1.10400	1.17720	9.56468	0.78007	Apr. 1	1.26237	0.65256	9.70658	0.79192
2	1.11220	1.16999	9.56827	0.78103	2	1.26062	0.68441	9.70842	0.79088
3	1.12011	1.16253	9.57179	0.78199	3	1.25874	0.71394	9.71025	0.78980
4	1.12774	1.15481	9.57525	0.78294	4	1.25672	0.74147	9.71209	0.78867
5	-1.13511	+1.14681	+9.57865	-0.78389	5	-1.25457	-0.76722	+9.71394	-0.78750
6	1.14221	1.13852	9.58197	0.78484	6	1.25227	0.79138	9.71578	0.78630
7	1.14906	1.12993	9.58523	0.78577	7	1.24984	0.81418	9.71764	0.78504
8	1.15567	1.12103	9.58845	0.78670	8	1.24727	0.83563	9.71951	0.78374
9	1.16206	1.11182	9.59160	0.78762	9	1.24456	0.85599	9.72138	0.78241
10	-1.16821	+1.10227	+9.59469	-0.78853	10	-1.24170	-0.87530	+9.72326	-0.78104
11	1.17413	1.09237	9.59773	0.78942	11	1.23869	0.89366	9.72515	0.77964
12	1.18985	1.08211	9.60070	0.79029	12	1.23554	0.91114	9.72705	0.77819
13	1.18536	1.07146	9.60363	0.79114	13	1.23225	0.92781	9.72896	0.77670
14	1.19066	1.06041	9.60650	0.79198	14	1.22880	0.94374	9.73086	0.77518
15	-1.19576	+1.04893	+9.60933	-0.79281	15	-1.22519	-0.95897	+9.73278	-0.77362
16	1.20067	1.03701	9.61210	0.79361	16	1.22143	0.97357	9.73471	0.77202
17	1.20539	1.02462	9.61484	0.79438	17	1.21751	0.93756	9.73665	0.77041
18	1.20992	1.01173	9.61751	0.79513	18	1.21343	1.00098	9.73861	0.76876
19	1.21427	0.99831	9.62014	0.79586	19	1.20919	1.01387	9.74058	0.76707
20	-1.21844	+0.98432	+9.62273	-0.79656	20	-1.20478	-1.02626	+9.74256	-0.76536
21	1.22244	0.96975	9.62528	0.79723	21	1.20020	1.03817	9.74454	0.76363
22	1.22627	0.95455	9.62779	0.79787	22	1.19545	1.04964	9.74653	0.76186
23	1.22993	0.93866	9.63026	0.79848	23	1.19052	1.06069	9.74854	0.76007
24	1.23342	0.92203	9.63267	0.79906	24	1.18542	1.07134	9.75055	0.75824
25	-1.23676	+0.90461	+9.63506	-0.79961	25	-1.18013	-1.08160	+9.75257	-0.75639
26	1.23993	0.88634	9.63743	0.80013	26	1.17465	1.09150	9.75461	0.75453
27	1.24294	0.86713	9.63975	0.80061	27	1.16897	1.10104	9.75666	0.75265
28	1.24580	0.84690	9.64203	0.80105	28	1.16309	1.11026	9.75872	0.75075
29	1.24851	0.82556	9.64428	0.80146	29	1.15701	1.11916	9.76079	0.74884
30	-1.25107	+0.80299	+9.64651	-0.80183	30	-1.15073	-1.12775	+9.76286	-0.74691
31	-1.25348	+0.77906	+9.64870	-0.80216	31	-1.14423	-1.13605	+9.76496	-0.74496



## FOR WASHINGTON MEAN MIDNIGHT.

## LOGARITHMS FOR CORRECTING THE PLACES OF THE FIXED STARS.

Date.	A.	B.	C.	D.	Date.	A.	B.	C.	D.
May 1	-1.14423	-1.13605	+9.76496	-0.74496	July 1	+0.53257	-1.30330	+9.89857	-0.65992
2	1.18751	1.14407	9.76706	0.74298	2	0.56994	1.30190	9.90056	0.65990
3	1.13056	1.15181	9.76916	0.74099	3	0.60423	1.30038	9.90254	0.65993
4	1.12338	1.15929	9.77129	0.73898	4	0.63590	1.29873	9.90451	0.66002
5	1.11595	1.16652	9.77343	0.73696	5	0.66530	1.29695	9.90646	0.66016
6	-1.10827	-1.17351	+9.77557	-0.73495	6	+0.69273	-1.29505	+9.90839	-0.66034
7	1.10033	1.18027	9.77772	0.73294	7	0.71842	1.29302	9.91031	0.66058
8	1.09212	1.18679	9.77987	0.73091	8	0.74257	1.29086	9.91221	0.66085
9	1.08363	1.19310	9.78204	0.72889	9	0.76533	1.28856	9.91409	0.66118
10	1.07484	1.19519	9.78422	0.72688	10	0.78685	1.28613	9.91596	0.66155
11	-1.06576	-1.20507	+9.78641	-0.72485	11	+0.80723	-1.28357	+9.91781	-0.66198
12	1.05636	1.21076	9.78860	0.72283	12	0.82660	1.28087	9.91965	0.66243
13	1.04663	1.21625	9.79080	0.72081	13	0.84502	1.27803	9.92146	0.66295
14	1.03655	1.22154	9.79302	0.71879	14	0.86258	1.27505	9.92325	0.66350
15	1.02611	1.22665	9.79524	0.71678	15	0.87935	1.27193	9.92503	0.66408
16	-1.01529	-1.23157	+9.79747	-0.71478	16	+0.89539	-1.26866	+9.92680	-0.66470
17	1.00408	1.23631	9.79970	0.71279	17	0.91073	1.26525	9.92854	0.66536
18	0.99244	1.24089	9.80194	0.71082	18	0.92543	1.26169	9.93026	0.66606
19	0.98036	1.24529	9.80419	0.70887	19	0.93954	1.25797	9.93196	0.66679
20	0.96782	1.24952	9.80643	0.70694	20	0.95309	1.25410	9.93365	0.66755
21	-0.95478	-1.25360	+9.80868	-0.70502	21	+0.96612	-1.25008	+9.93533	-0.66833
22	0.94131	1.25751	9.81093	0.70312	22	0.97865	1.24589	9.93698	0.66913
23	0.92709	1.26126	9.81319	0.70124	23	0.99071	1.24154	9.93861	0.66996
24	0.91238	1.26486	9.81545	0.69939	24	1.00233	1.23702	9.94023	0.67081
25	0.89703	1.26831	9.81771	0.69756	25	1.01353	1.23234	9.94183	0.67169
26	-0.88099	-1.27161	+9.81998	-0.69575	26	+1.02434	-1.22748	+9.94341	-0.67259
27	0.86422	1.27476	9.82225	0.69398	27	1.03477	1.22244	9.94497	0.67351
28	0.84666	1.27776	9.82453	0.69223	28	1.04483	1.21722	9.94651	0.67446
29	0.82824	1.28062	9.82680	0.69051	29	1.05455	1.21181	9.94803	0.67541
30	0.80888	1.28334	9.82907	0.68883	30	1.06394	1.20621	9.94954	0.67638
31	-0.78850	-1.28593	+9.83134	-0.68717	31	+1.07301	-1.20042	+9.95103	-0.67735
June 1	0.76701	1.28838	9.83360	0.68557	Aug. 1	1.08178	1.19442	9.95250	0.67833
2	0.74426	1.29069	9.83586	0.68401	2	1.09027	1.18821	9.95395	0.67932
3	0.72012	1.29287	9.83811	0.68249	3	1.09847	1.18179	9.95538	0.68032
4	0.69446	1.29492	9.84037	0.68101	4	1.10640	1.17515	9.95680	0.68132
5	-0.66707	-1.29684	+9.84263	-0.67957	5	+1.11408	-1.16828	+9.95820	-0.68232
6	0.63770	1.29863	9.84488	0.67817	6	1.12151	1.16117	9.95956	0.68332
7	0.60608	1.30029	9.84713	0.67681	7	1.12869	1.15381	9.96092	0.68433
8	0.57184	1.30182	9.84937	0.67550	8	1.13564	1.14619	9.96227	0.68534
9	0.53455	1.30323	9.85161	0.67424	9	1.14237	1.13832	9.96359	0.68634
10	-0.49362	-1.30451	+9.85383	-0.67303	10	+1.14887	-1.13018	+9.96490	-0.68732
11	0.44831	1.30567	9.85606	0.67187	11	1.15516	1.12175	9.96619	0.68830
12	0.39758	1.30670	9.85828	0.67076	12	1.16125	1.11303	9.96746	0.68925
13	0.34001	1.30761	9.86049	0.66970	13	1.16713	1.10400	9.96872	0.69019
14	0.27350	1.30840	9.86269	0.66869	14	1.17281	1.09465	9.96995	0.69113
15	-0.19474	-1.30907	+9.86489	-0.66774	15	+1.17830	-1.08497	+9.97117	-0.69205
16	0.09838	1.30962	9.86708	0.66684	16	1.18361	1.07493	9.97238	0.69296
17	0.97420	1.31004	9.86925	0.66599	17	1.18873	1.06453	9.97358	0.69385
18	0.79944	1.31034	9.87142	0.66519	18	1.19367	1.05374	9.97476	0.69472
19	0.50221	1.31053	9.87358	0.66445	19	1.19844	1.04254	9.97592	0.69557
20	-0.74043	-1.31059	+9.87573	-0.66377	20	+1.20303	-1.03092	+9.97707	-0.69638
21	+0.48685	1.31053	9.87786	0.66315	21	1.20746	1.01885	9.97820	0.69717
22	0.79165	1.31035	9.87999	0.66258	22	1.21172	1.00631	9.97932	0.69794
23	0.96890	1.31005	9.88211	0.66205	23	1.21582	0.99326	9.98042	0.69868
24	0.04931	1.30963	9.88421	0.66158	24	1.21977	0.97967	9.98151	0.69939
25	+0.19139	-1.30909	+9.88630	-0.66117	25	+1.22355	-0.96550	+9.98259	-0.70006
26	0.27058	1.30843	9.88838	0.66083	26	1.22718	0.95073	9.98366	0.70069
27	0.33742	1.30765	9.89045	0.66054	27	1.23066	0.93531	9.98472	0.70130
28	0.39521	1.30674	9.89251	0.66030	28	1.23399	0.91918	9.98576	0.70188
29	0.44611	1.30572	9.89455	0.66012	29	1.23717	0.90229	9.98679	0.70241
30	+0.49154	-1.30457	+9.89657	-0.66000	30	+1.24021	-0.88458	+9.98781	-0.70291
31	+0.53257	-1.30330	+9.89857	-0.65992	31	+1.24311	-0.86599	+9.98882	-0.70336



## FOR WASHINGTON MEAN MIDNIGHT.

### LOGARITHMS FOR CORRECTING THE PLACES OF THE FIXED STARS.

Date.	A.	B.	C.	D.	Date.	A.	B.	C.	D.
Sept. 1	+1.24587	-0.84642	+9.98981	-0.70378	Nov. 1	+1.15713	+1.11901	+0.04624	-0.63063
2	1.24848	0.82578	9.99080	0.70415	2	1.15063	1.12790	0.04733	0.62792
3	1.25096	0.80398	9.99177	0.70448	3	1.14389	1.13648	0.04842	0.62518
4	1.25330	0.78088	9.99273	0.70477	4	1.13691	1.14476	0.04952	0.62241
5	1.25551	0.75633	9.99369	0.70501	5	1.12967	1.15277	0.05063	0.61982
6	+1.25758	-0.73016	+9.99463	-0.70521	6	+1.12216	+1.16051	+0.05174	-0.61681
7	1.25952	0.70216	9.99556	0.70536	7	1.11439	1.16798	0.05287	0.61398
8	1.26133	0.67208	9.99649	0.70546	8	1.10634	1.17520	0.05401	0.61113
9	1.26301	0.63961	9.99742	0.70551	9	1.09880	1.18217	0.05516	0.60825
10	1.26455	0.60436	9.99834	0.70552	10	1.08935	1.18890	0.05632	0.60537
11	+1.26597	-0.56582	+9.99925	-0.70548	11	+1.08038	+1.19541	+0.05749	-0.60247
12	1.26726	0.52337	0.00015	0.70539	12	1.07108	1.20169	0.05866	0.59958
13	1.26841	0.47612	0.00105	0.70524	13	1.06143	1.20775	0.05984	0.59667
14	1.26944	0.42294	0.00194	0.70504	14	1.05143	1.21358	0.06103	0.59376
15	1.27035	0.36216	0.00283	0.70478	15	1.04105	1.21922	0.06223	0.59085
16	+1.27112	-0.29128	+0.00371	-0.70447	16	+1.03027	+1.22466	+0.06344	-0.58795
17	1.27177	0.20630	0.00459	0.70411	17	1.01907	1.22989	0.06466	0.58505
18	1.27229	0.10037	0.00546	0.70369	18	1.00744	1.23493	0.06588	0.58217
19	1.27268	9.95966	0.00633	0.70322	19	0.99534	1.23978	0.06711	0.57930
20	1.27295	9.74986	0.00720	0.70271	20	0.98275	1.24444	0.06835	0.57645
21	+1.27309	-9.32781	+0.00807	-0.70214	21	+0.96964	+1.24892	+0.06959	-0.57362
22	1.27311	+9.13661	0.00893	0.70150	22	0.95598	1.25323	0.07084	0.57081
23	1.27300	9.68733	0.00979	0.70080	23	0.94174	1.25736	0.07210	0.56802
24	1.27276	9.92253	0.01065	0.70005	24	0.92687	1.26132	0.07336	0.56525
25	1.27239	0.07423	0.01151	0.69923	25	0.91132	1.26511	0.07463	0.56250
26	+1.27189	+0.18639	+0.01237	-0.69836	26	+0.89505	+1.26873	+0.07589	-0.55978
27	1.27127	0.27537	0.01323	0.69742	27	0.87800	1.27219	0.07717	0.55711
28	1.27051	0.34913	0.01410	0.69645	28	0.86010	1.27549	0.07846	0.55450
29	1.26963	0.41208	0.01496	0.69540	29	0.84129	1.27863	0.07975	0.55192
30	1.26861	0.46697	0.01582	0.69431	30	0.82148	1.28161	0.08104	0.54938
31	+1.26746	+0.51560	+0.01668	-0.69316	31	+0.80057	+1.28443	+0.08234	-0.54689
Oct. 1	1.26746	0.51560	0.01668	0.69316	Dec. 1	0.80057	1.28443	0.08234	0.54689
2	1.26618	0.55924	0.01755	0.69193	2	0.77845	1.28711	0.08365	0.54445
3	1.26477	0.59881	0.01842	0.69067	3	0.75500	1.28964	0.08495	0.54207
4	1.26322	0.63496	0.01929	0.68933	4	0.73004	1.29201	0.08626	0.53974
5	+1.26154	-0.66824	+0.02017	-0.68793	5	+0.70339	+1.29424	+0.08756	-0.53747
6	1.25972	0.69906	0.02105	0.68648	6	0.67484	1.29632	0.08887	0.53526
7	1.25776	0.72773	0.02192	0.68497	7	0.64414	1.29825	0.09018	0.53312
8	1.25566	0.75452	0.02281	0.68341	8	0.61098	1.30004	0.09150	0.53106
9	1.25342	0.77962	0.02371	0.68179	9	0.57492	1.30169	0.09281	0.52905
10	+1.25104	-0.80327	+0.02461	-0.68011	10	+0.53540	+1.30320	+0.09413	-0.52711
11	1.24851	0.82559	0.02551	0.67838	11	0.49174	1.30456	0.09544	0.52525
12	1.24582	0.84670	0.02642	0.67660	12	0.44306	1.30579	0.09676	0.52347
13	1.24300	0.86672	0.02734	0.67477	13	0.38804	1.30687	0.09807	0.52178
14	1.24003	0.88574	0.02827	0.67288	14	0.32487	1.30782	0.09938	0.52016
15	+1.23690	+0.90384	+0.02920	-0.67094	15	+0.25074	+1.30862	+0.10070	-0.51862
16	1.23361	0.92111	0.03014	0.66893	16	0.16112	1.30929	0.10200	0.51717
17	1.23016	0.93760	0.03108	0.66687	17	0.04787	1.30982	0.10330	0.51582
18	1.22655	0.95337	0.03203	0.66477	18	9.89406	1.31021	0.10461	0.51454
19	1.22278	0.96846	0.03299	0.66262	19	9.65347	1.31046	0.10591	0.51335
20	+1.21884	-0.98293	+0.03396	-0.66040	20	+9.06757	+1.31058	+0.10721	-0.51224
21	1.21474	0.99681	0.03494	0.65814	21	-9.33577	1.31056	0.10850	0.51123
22	1.21046	1.01015	0.03592	0.65585	22	9.74042	1.31040	0.10979	0.51030
23	1.20600	1.02296	0.03691	0.65352	23	9.94612	1.31010	0.11108	0.50946
24	1.20135	1.03528	0.03791	0.65113	24	0.08504	1.30967	0.11236	0.50872
25	+1.19652	-1.04714	+0.03892	-0.64871	25	-0.19003	+1.30910	+0.11364	-0.50809
26	1.19150	1.05857	0.03994	0.64625	26	0.27439	1.30839	0.11491	0.50755
27	1.18629	1.06957	0.04097	0.64373	27	0.34489	1.30755	0.11617	0.50710
28	1.18088	1.08018	0.04201	0.64118	28	0.40541	1.30656	0.11743	0.50674
29	1.17526	1.09042	0.04306	0.63859	29	0.45842	1.30543	0.11868	0.50645
30	+1.16944	+1.10030	+0.04411	-0.63597	30	-0.50551	+1.30416	+0.11992	-0.50627
31	+1.16340	+1.10982	+0.04517	-0.63332	31	-0.54789	+1.30275	+0.12116	-0.50617



FOR WASHINGTON MEAN MIDNIGHT.								
CONSTANTS FOR FACILITATING THE REDUCTION OF THE FIXED STARS.								
1860.	<i>f.</i>	Log. <i>g.</i>	<i>g.</i>	Log. <i>h.</i>	<i>h.</i>	Log. <i>i.</i>	<i>τ.</i>	
January	1	+11.89	0.8889	311 58	1.3093	349 48	-0.1950	0.000
	6	12.77	0.9038	313 55	1.3079	345 5	0.3560	0.014
	11	13.63	0.9189	315 38	1.3060	340 20	0.4705	0.027
	16	14.46	0.9338	317 7	1.3037	335 32	0.5583	0.041
	21	15.26	0.9484	318 24	1.3010	330 41	0.6283	0.055
February	26	+16.02	0.9623	319 30	1.2980	325 47	-0.6855	0.068
	31	16.76	0.9758	320 28	1.2948	320 49	0.7330	0.082
	5	17.45	0.9883	321 18	1.2916	315 46	0.7726	0.096
	10	18.11	0.9999	322 1	1.2882	310 40	0.8057	0.110
	15	18.73	1.0107	322 41	1.2850	305 30	0.8383	0.123
March	20	+19.32	1.0206	323 18	1.2820	300 15	-0.8559	0.137
	25	19.87	1.0297	323 53	1.2793	294 58	0.8743	0.151
	1	20.41	1.0380	324 28	1.2770	289 37	0.8885	0.164
	6	20.92	1.0456	325 3	1.2752	284 14	0.8991	0.178
	11	21.41	1.0525	325 40	1.2739	278 50	0.9062	0.192
April	16	+21.89	1.0589	326 18	1.2732	273 25	-0.9099	0.205
	21	22.37	1.0648	327 0	1.2732	268 0	0.9104	0.219
	26	22.85	1.0704	327 44	1.2737	262 37	0.9075	0.233
	31	23.34	1.0758	328 32	1.2748	257 16	0.9014	0.246
	5	23.83	1.0811	329 23	1.2764	251 58	0.8920	0.260
May	10	+24.35	1.0865	330 17	1.2785	246 44	-0.8792	0.274
	15	24.89	1.0920	331 15	1.2811	241 34	0.8637	0.287
	20	25.46	1.0978	332 14	1.2838	236 28	0.8422	0.301
	25	26.05	1.1038	333 15	1.2869	231 27	0.8176	0.315
	30	26.68	1.1102	334 17	1.2900	226 31	0.7882	0.329
June	5	+27.34	1.1170	335 20	1.2933	221 40	-0.7534	0.342
	10	28.03	1.1244	336 21	1.2963	216 54	0.7123	0.356
	15	28.75	1.1322	337 22	1.2993	212 13	0.6636	0.370
	20	29.50	1.1404	338 20	1.3020	207 36	0.6053	0.383
	25	30.28	1.1489	339 15	1.3044	203 2	0.5345	0.397
July	30	+31.08	1.1579	340 7	1.3065	198 32	-0.4463	0.411
	4	31.90	1.1672	340 54	1.3082	194 5	0.3819	0.424
	9	32.73	1.1765	341 38	1.3094	189 40	0.1720	0.438
	14	33.58	1.1859	342 17	1.3102	185 16	9.9110	0.452
	19	34.43	1.1955	342 51	1.3106	180 54	-9.1397	0.465
August	24	+35.28	1.2050	343 20	1.3104	176 31	+9.7318	0.479
	29	36.13	1.2144	343 46	1.3098	172 8	0.0836	0.493
	4	36.97	1.2235	344 7	1.3088	167 44	0.2734	0.507
	9	37.80	1.2325	344 24	1.3072	163 19	0.4028	0.520
	14	38.61	1.2412	344 38	1.3053	158 51	0.5001	0.534
September	19	+39.39	1.2495	344 49	1.3030	154 21	+0.5770	0.548
	24	40.14	1.2575	344 58	1.3004	149 47	0.6398	0.561
	29	40.87	1.2650	345 4	1.2976	145 9	0.6920	0.575
	3	41.57	1.2723	345 9	1.2946	140 28	0.7359	0.589
	8	42.23	1.2791	345 14	1.2915	135 42	0.7731	0.602
October	13	+42.87	1.2854	345 16	1.2884	130 51	+0.8046	0.616
	18	43.47	1.2913	345 19	1.2853	125 55	0.8311	0.630
	23	44.04	1.2969	345 22	1.2824	120 55	0.8533	0.643
	28	44.58	1.3021	345 26	1.2798	115 51	0.8715	0.657
	2	45.10	1.3070	345 31	1.2775	110 42	0.8859	0.671
November	7	+45.60	1.3115	345 38	1.2756	105 29	+0.8970	0.684
	12	46.08	1.3158	345 47	1.2742	100 13	0.9048	0.698
	17	46.56	1.3199	345 57	1.2731	94 55	0.9092	0.712
	22	47.03	1.3239	346 10	1.2731	89 35	0.9106	0.726
	27	47.49	1.3277	346 26	1.2735	84 14	0.9087	0.739
December	2	+47.97	1.3315	346 43	1.2744	78 53	+0.9036	0.753
	7	48.46	1.3353	347 3	1.2759	73 34	0.8952	0.767
	12	+48.96	1.3391	347 25	1.2779	68 15	+0.8833	0.780



## FOR WASHINGTON MEAN MIDNIGHT.

## CONSTANTS FOR FACILITATING THE REDUCTION OF THE FIXED STARS.

1860.	<i>f</i> .	Log. <i>g</i> .	<i>G</i> .	Log. <i>h</i> .	<i>H</i> .	Log. <i>i</i> .	<i>τ</i> .
October 17	+49.49	1.3431	347 49	1.2803	62 59	+0.8676	0.794
22	50.04	1.3473	348 14	1.2831	57 46	0.8479	0.808
27	50.63	1.3516	348 41	1.2862	52 36	0.8288	0.821
November 1	51.25	1.3560	349 8	1.2894	47 31	0.7946	0.835
6	51.90	1.3611	349 36	1.2927	42 28	0.7596	0.849
11	+52.59	1.3662	350 8	1.2959	37 30	+0.7178	0.862
16	53.31	1.3716	350 30	1.2991	32 35	0.6677	0.876
21	54.08	1.3772	350 56	1.3018	27 44	0.6071	0.890
26	54.87	1.3831	351 20	1.3045	22 56	0.5325	0.903
December 1	55.69	1.3891	351 43	1.3066	18 10	0.4380	0.917
6	+56.53	1.3952	352 3	1.3084	13 27	+0.3123	0.931
11	57.39	1.4014	352 20	1.3096	8 45	0.1292	0.945
16	58.27	1.4078	352 35	1.3104	4 4	+9.7986	0.958
21	59.15	1.4141	352 48	1.3106	359 24	-8.9732	0.972
26	60.03	1.4204	352 58	1.3102	354 43	9.9118	0.986
31	+60.90	1.4265	353 5	1.3094	350 1	-0.1853	0.999

## BESSEL'S FORMULÆ OF REDUCTION FOR THE FIXED STARS,

WITH DR. PETERS'S COEFFICIENTS, AND THE NOTATION OF THE CATALOGUE OF STARS  
OF THE BRITISH ASSOCIATION.

$$A = -20''.4451 \cos \omega \cos \odot.$$

$$B = -20''.4451 \sin \odot.$$

$$C = \tau - 0.34238 \sin \Omega + 0.00410 \sin 2 \Omega - 0.02519 \sin 2 \odot + 0.00294 \sin (\odot + 82^\circ 34') - 0.00405 \sin 2 \odot + 0.00135 \sin (\odot - I').$$

$$D = -9''.2236 \cos \Omega + 0''.0896 \cos 2 \Omega - 0''.5507 \cos 2 \odot - 0''.0092 \cos (\odot + 280^\circ 22') - 0''.0885 \cos 2 \odot.$$

$$E = -0''.0481 \sin \Omega + 0''.0014 \sin 2 \Omega - 0''.0034 \sin 2 \odot.$$

$$a = \cos \alpha \sec \delta.$$

$$b = \sin \alpha \sec \delta.$$

$$c = 46''.0780 + 20''.0560 \sin \alpha \tan \delta.$$

$$d = \cos \alpha \tan \delta.$$

$$a' = \tan \omega \cos \delta - \sin \alpha \sin \delta.$$

$$b' = \cos \alpha \sin \delta.$$

$$c' = 20''.0560 \cos \alpha.$$

$$d' = -\sin \alpha.$$

$\mu$  = the annual proper motion in right ascension.

$\mu'$  = the annual proper motion in declination.

$\tau$  = the time from the beginning of the year in fractional parts of the year.

$\odot$  = the sun's longitude.

$\odot$  = the moon's longitude.

$\Omega$  = the longitude of the moon's ascending node.

$\omega$  = the obliquity of the ecliptic.

$\alpha$  = the star's mean right ascension for the beginning of the year.

$\delta$  = the star's mean declination for the beginning of the year.

$\alpha'$  = the star's apparent right ascension at the time  $\tau$ .

$\delta'$  = the star's apparent declination at the time  $\tau$ .

$$\alpha' - \alpha = A a + B b + C c + D d + E + \tau \mu.$$

$$\delta' - \delta = A a' + B b' + C c' + D d' + \tau \mu'.$$

The following formulæ may also be used by putting

$$f = 46''.0780 C.$$

$$g \cos G = 20''.0560 C.$$

$$g \sin G = D.$$

$$i = A \tan \alpha.$$

$$h \cos H = B.$$

$$h \sin H = A.$$

$$\alpha' - \alpha = f + \tau \mu + g \sin (G + \alpha) \tan \delta + h \sin (H + \alpha) \sec \delta.$$

$$\delta' - \delta = i \cos \delta + \tau \mu' + g \cos (G + \alpha) + h \cos (H + \alpha) \sin \delta.$$



MEAN PLACES OF 100 PRINCIPAL FIXED STARS, FOR  
JANUARY 1, 1860.

Star's Name.	Magnitude.	Right Ascension.			An. Variation.	Declination.			An. Variation.
		<sup>h.</sup>	<sup>m.</sup>	<sup>s.</sup>	<sup>s.</sup>	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	<sup>"</sup>
$\alpha$ ANDROMEDÆ . . . . .	2	0	1	9.41	+ 3.085	+28	19	2.8	+19.91
$\gamma$ PEGASI ( <i>Algenib</i> ) . . . . .	3.2	0	6	1.77	3.081	+14	24	17.9	20.03
$\beta$ Hydri . . . . .	3	0	18	20.06	3.287	—78	2	36.9	20.24
$\alpha$ CASSIOPEÆ . . . . .	var.	0	32	35.08	3.360	+55	46	8.3	19.83
$\beta$ Ceti . . . . .	2	0	36	33.55	3.016	—18	45	20.9	19.82
$\alpha$ URS. MIN. ( <i>Polaris</i> ) . . . . .	2	1	8	2.49	+18.807	+88	33	47.4	+19.18
$\delta^1$ Ceti . . . . .	3	1	17	1.60	3.000	— 8	54	24.9	18.74
$\alpha$ Eridani ( <i>Achernar</i> ) . . . . .	1	1	32	29.67	2.238	—57	56	55.7	18.45
$\alpha$ ARIETIS . . . . .	2	1	59	17.27	3.365	+22	47	54.7	17.25
$\gamma$ Ceti . . . . .	3.4	2	36	2.93	3.102	+ 2	38	36.7	15.39
$\alpha$ CETI . . . . .	2.3	2	54	57.80	+ 3.127	+ 3	32	16.0	+14.36
$\alpha$ PERSEI . . . . .	2	3	14	20.73	4.244	+49	21	33.3	13.24
$\eta$ Tauri . . . . .	3	3	39	10.06	3.553	+23	40	8.9	11.53
$\gamma^1$ Eridani . . . . .	3	3	51	29.89	2.796	—13	54	34.4	10.57
$\alpha$ TAURI ( <i>Aldebaran</i> ) . . . . .	1	4	27	53.45	3.435	+16	13	27.9	7.66
$\alpha$ AURIGÆ ( <i>Capella</i> ) . . . . .	1	5	6	21.17	+ 4.423	+45	51	3.3	+ 4.20
$\beta$ ORIONIS ( <i>Rigel</i> ) . . . . .	1	5	7	48.63	2.880	— 8	22	0.3	4.49
$\beta$ TAURI . . . . .	2	5	17	26.63	3.788	+28	29	5.4	3.48
$\delta$ ORIONIS . . . . .	2	5	24	51.35	3.066	— 0	24	22.4	3.04
$\alpha$ Leporis . . . . .	3	5	26	33.41	2.648	—17	55	31.2	2.93
$\epsilon$ ORIONIS . . . . .	2	5	29	6.63	+ 3.044	— 1	17	40.8	+ 2.70
$\alpha$ Columbæ . . . . .	2	5	34	34.93	2.177	—34	9	2.8	2.22
$\alpha$ ORIONIS . . . . .	var.	5	47	35.57	3.246	+ 7	22	38.0	+ 1.06
$\mu$ Geminorum . . . . .	3	6	14	29.45	3.636	+22	34	53.0	— 1.40
$\alpha$ Argus ( <i>Canopus</i> ) . . . . .	1	6	20	50.78	1.330	—52	37	13.7	1.81
51 (Hev.) Cephei . . . . .	5	6	33	38.52	+30.471	+87	14	53.6	— 3.01
$\alpha$ CANIS MAJ. ( <i>Sirius</i> ) . . . . .	1	6	38	58.86	2.647	—16	31	35.9	4.62
$\epsilon$ Canis Majoris . . . . .	2.1	6	53	7.46	2.360	—28	47	3.7	4.61
$\delta$ Geminorum . . . . .	3.4	7	11	45.61	3.597	+22	14	11.1	6.18
$\alpha^2$ GEMINOR. ( <i>Castor</i> ) . . . . .	2.1	7	25	39.45	3.840	+32	11	28.4	7.44
$\alpha$ CAN. MIN. ( <i>Procyon</i> ) . . . . .	1	7	31	58.28	+ 3.146	+ 5	34	51.6	— 8.89
$\beta$ GEMINOR. ( <i>Pollux</i> ) . . . . .	1.2	7	36	44.65	3.682	+28	21	38.3	8.31
15 Argus . . . . .	3	8	1	34.95	2.558	—23	54	10.9	10.07
$\epsilon$ Hydræ . . . . .	3.4	8	39	21.63	3.189	+ 6	55	48.1	12.87
$\epsilon$ Ursæ Majoris . . . . .	3	8	49	36.20	4.142	+48	35	17.8	13.79
$\epsilon$ Argus . . . . .	2	9	13	20.53	+ 1.602	—58	41	17.8	—14.89
$\alpha$ HYDRÆ . . . . .	2	9	20	42.40	2.948	— 8	3	14.1	15.39
$\theta$ Ursæ Majoris . . . . .	3	9	23	28.24	4.058	+52	18	45.7	16.12
$\epsilon$ Leonis . . . . .	3	9	37	53.93	3.424	+24	25	1.0	16.35
$\alpha$ LEONIS ( <i>Regulus</i> ) . . . . .	1.2	10	0	54.74	3.203	+12	38	59.3	17.42
$\eta$ Argus . . . . .	2	10	39	38.27	+ 2.305	—58	56	55.2	—18.73
$\alpha$ URSÆ MAJORIS . . . . .	2	10	55	3.44	3.775	+62	30	20.7	19.34
$\delta$ LEONIS . . . . .	2.3	11	6	39.51	3.208	+21	17	24.5	19.65
$\delta$ Hydræ et Crateris . . . . .	3.4	11	12	20.58	+ 2.997	—14	1	17.5	—19.45



MEAN PLACES OF 100 PRINCIPAL FIXED STARS, FOR  
JANUARY 1, 1860.

Star's Name.	Magnitude.	Right Ascension.	An. Variation.	Declination.	An. Variation.
		h. m. s.	s.	° ' "	
$\beta$ LEONIS . . . . .	2	11 41 54.94	+ 3.065	+15 21 16.3	-20.10
$\gamma$ URSÆ MAJORIS . . . . .	2.3	11 46 26.97	3.194	+54 28 22.9	20.04
$\beta$ Chamæleonis . . . . .	5	12 10 12.63	3.321	-78 32 5.6	20.05
$\alpha^1$ Crucis . . . . .	1	12 18 50.09	3.258	-62 19 19.9	19.94
$\beta$ Corvi . . . . .	2.3	12 27 2.22	3.132	-22 37 19.5	19.99
12 Canum Venaticorum . . . . .	3	12 49 28.34	+ 2.822	+39 4 30.8	-19.56
$\alpha$ VIRGINIS ( <i>Spica</i> ) . . . . .	1	13 17 49.26	3.150	-10 25 46.8	18.95
$\eta$ URSÆ MAJORIS . . . . .	2	13 42 1.18	2.371	+50 0 47.2	18.14
$\eta$ Bootis . . . . .	3	13 48 1.13	2.862	+19 6 3.7	18.23
$\beta$ Centauri . . . . .	1	13 53 58.68	4.153	-59 41 42.9	17.72
$\alpha$ Bootis ( <i>Arcturus</i> ) . . . . .	1	14 9 16.57	+ 2.733	+19 54 46.6	-18.91
$\alpha^2$ Centauri . . . . .	1	14 30 7.99	4.027	-60 15 8.8	15.08
$\epsilon$ Bootis . . . . .	2.3	14 38 52.33	2.622	+27 39 58.5	15.44
$\alpha^3$ LIBRÆ . . . . .	3	14 43 8.31	+ 3.305	-15 27 27.5	15.24
$\beta$ URSÆ MINORIS . . . . .	2	14 51 9.19	- 0.260	+74 43 38.6	14.78
$\beta$ Libræ . . . . .	2	15 9 28.61	+ 3.220	- 8 51 49.1	-13.59
$\alpha$ CORONÆ BOREALIS . . . . .	2	15 28 45.65	2.538	+27 11 17.2	12.36
$\alpha$ SERPENTIS . . . . .	2.3	15 37 22.40	+ 2.949	+ 6 52 6.7	11.63
$\zeta$ URSÆ MINORIS . . . . .	4.5	15 49 8.42	- 2.309	+78 13 23.8	10.83
$\beta^1$ Scorpii . . . . .	2	15 57 18.06	+ 3.479	-19 25 8.1	10.27
$\delta$ OPHIUCHI . . . . .	3	16 7 0.65	+ 3.138	- 3 19 50.7	- 9.62
$\alpha$ SCORPII ( <i>Antares</i> ) . . . . .	1.2	16 20 49.69	3.666	-26 7 4.3	8.43
$\eta$ DRACONIS . . . . .	3.2	16 22 6.55	0.821	+61 49 55.1	8.23
$\alpha$ TRIANGULI AUSTRALIS . . . . .	2	16 33 52.79	+ 6.272	-68 45 50.3	7.49
$\epsilon$ URSÆ MINORIS . . . . .	4.5	17 0 27.03	- 6.426	+82 15 41.0	5.14
$\alpha$ HERCULIS . . . . .	var.	17 8 15.87	+ 2.732	+14 33 9.6	- 4.44
$\beta$ DRACONIS . . . . .	3.2	17 27 16.24	1.353	+52 24 23.2	2.85
$\alpha$ OPHIUCHI . . . . .	2	17 28 26.19	2.781	+12 39 53.8	2.95
$\sigma$ OCTANTIS . . . . .	6	17 48 8.00	109.554	-89 16 40.3	0.95
$\gamma$ DRACONIS . . . . .	2.3	17 53 21.37	1.394	+51 30 24.0	- 0.61
$\mu^1$ Sagittarii . . . . .	4	18 5 23.36	+ 3.587	-21 5 29.8	+ 0.48
$\delta$ URSÆ MINORIS . . . . .	4.5	18 17 30.37	-19.349	+86 36 6.9	1.55
$\alpha$ LYRÆ ( <i>Vega</i> ) . . . . .	1	18 32 11.91	+ 2.031	+38 39 19.2	3.10
$\beta$ LYRÆ . . . . .	var.	18 44 54.62	2.215	+33 12 8.3	3.88
$\zeta$ AQUILÆ . . . . .	3	18 58 58.42	2.755	+13 39 30.3	5.04
$\delta$ AQUILÆ . . . . .	3.4	19 18 26.29	+ 3.027	+ 2 50 19.5	+ 6.83
$\gamma$ AQUILÆ . . . . .	3	19 39 36.18	2.852	+10 16 29.1	8.46
$\alpha$ AQUILÆ ( <i>Altair</i> ) . . . . .	1.2	19 43 57.11	2.928	+ 8 30 4.5	9.18
$\beta$ AQUILÆ . . . . .	4	19 48 26.12	+ 2.947	+ 6 3 34.6	8.67
$\lambda$ URSÆ MINORIS . . . . .	5	20 3 53.82	-56.307	+88 53 24.5	10.30
$\alpha^2$ CAPRICORNI . . . . .	3.4	20 10 17.01	+ 3.333	-12 58 34.4	+10.81
$\alpha$ PAVONIS . . . . .	2	20 14 33.20	4.802	-57 10 44.7	11.07
$\alpha$ CYGNI . . . . .	2.1	20 36 39.57	2.043	+44 46 53.7	12.67
61 <sup>1</sup> CYGNI . . . . .	5.6	21 0 37.23	+ 2.676	+38 3 46.7	+17.46



MEAN PLACES OF 100 PRINCIPAL FIXED STARS, FOR  
JANUARY 1, 1860.

Star's Name	Magnitude.	Right Ascension.			An. Variation.	Declination.			An. Variation.
		<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>sec.</i>	<i>°</i>	<i>'</i>	<i>"</i>	<i>sec.</i>
ζ Cygni . . . .	3	21	6	58.68	+ 2.550	+29	39	16.1	+14.54
α CEPHEI . . . .	3.2	21	15	14.08	1.439	+61	59	35.4	15.10
β AQUARI . . . .	3	21	24	11.11	3.163	— 6	11	5.8	15.62
β CEPHEI . . . .	3	21	26	50.38	0.803	+69	56	47.2	15.69
ε Pegasi . . . .	2.3	21	37	18.58	2.951	+ 9	14	5.7	16.31
α AQUARI . . . .	3	21	58	35.48	+ 3.083	— 0	59	55.3	+17.31
α GRUIS . . . .	2	21	59	23.50	3.820	—47	38	11.7	17.15
ζ Pegasi . . . .	3.4	22	34	28.66	2.990	+10	6	6.4	18.69
α PIS. AUS. ( <i>Fomalhaut</i> )	1.2	22	49	54.38	3.330	—30	21	50.4	18.94
α PEGASI ( <i>Markab</i> ) .	2	22	57	47.34	2.988	+14	27	10.3	19.31
ι Piscium . . . .	4.5	23	32	45.04	+ 3.084	+ 4	52	4.4	+19.47
γ Cephei . . . .	3.4	23	33	37.95	+ 2.394	+76	51	4.1	+20.07



APPARENT PLACES OF  $\alpha$  URSÆ MINORIS, (*Polaris*), FOR THE  
UPPER TRANSIT AT WASHINGTON.

Sideral Day of the Month.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		Sideral Day of the Month.
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	
	<sup>h.</sup> 1	<sup>m.</sup> 7	<sup>h.</sup> 1	<sup>m.</sup> 7	<sup>h.</sup> 1	<sup>m.</sup> 7	<sup>h.</sup> 1	<sup>m.</sup> 7	
	88°	34'	88°	34'	88°	34'	88°	33'	
1	59.06	14.19	59.06	14.19	59.06	14.19	59.06	14.19	1
2	58.28	14.25	58.28	14.25	58.28	14.25	58.28	14.25	2
3	57.56	14.31	57.56	14.31	57.56	14.31	57.56	14.31	3
4	56.84	14.39	56.84	14.39	56.84	14.39	56.84	14.39	4
5	56.12	14.48	56.12	14.48	56.12	14.48	56.12	14.48	5
6	55.39	14.59	55.39	14.59	55.39	14.59	55.39	14.59	6
7	54.60	14.69	54.60	14.69	54.60	14.69	54.60	14.69	7
8	53.74	14.78	53.74	14.78	53.74	14.78	53.74	14.78	8
9	52.82	14.86	52.82	14.86	52.82	14.86	52.82	14.86	9
10	51.85	14.92	51.85	14.92	51.85	14.92	51.85	14.92	10
11	50.89	14.96	50.89	14.96	50.89	14.96	50.89	14.96	11
12	49.96	14.96	49.96	14.96	49.96	14.96	49.96	14.96	12
13	49.07	14.94	49.07	14.94	49.07	14.94	49.07	14.94	13
14	48.24	14.92	48.24	14.92	48.24	14.92	48.24	14.92	14
15	47.48	14.90	47.48	14.90	47.48	14.90	47.48	14.90	15
16	46.73	14.90	46.73	14.90	46.73	14.90	46.73	14.90	16
17	45.99	14.90	45.99	14.90	45.99	14.90	45.99	14.90	17
18	45.27	14.91	45.27	14.91	45.27	14.91	45.27	14.91	18
19	44.49	14.92	44.49	14.92	44.49	14.92	44.49	14.92	19
20	43.68	14.94	43.68	14.94	43.68	14.94	43.68	14.94	20
21	42.83	14.94	42.83	14.94	42.83	14.94	42.83	14.94	21
22	41.95	14.94	41.95	14.94	41.95	14.94	41.95	14.94	22
23	41.04	14.92	41.04	14.92	41.04	14.92	41.04	14.92	23
24	40.11	14.88	40.11	14.88	40.11	14.88	40.11	14.88	24
25	39.18	14.81	39.18	14.81	39.18	14.81	39.18	14.81	25
26	38.29	14.73	38.29	14.73	38.29	14.73	38.29	14.73	26
27	37.42	14.63	37.42	14.63	37.42	14.63	37.42	14.63	27
28	36.61	14.53	36.61	14.53	36.61	14.53	36.61	14.53	28
29	35.83	14.42	35.83	14.42	35.83	14.42	35.83	14.42	29
30	35.10	14.31	35.10	14.31	35.10	14.31	35.10	14.31	30
31	34.39	14.21	34.39	14.21	34.39	14.21	34.39	14.21	31
32	33.71	14.12	33.71	14.12	33.71	14.12	33.71	14.12	32



APPARENT PLACES OF  $\alpha$  URSÆ MINORIS, (*Polaris*), FOR THE  
UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	MAY		JUNE.		JULY.		AUGUST.		Sidereal Day of the Month.
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	
	<sup>h.</sup> 1	<sup>m.</sup> 7	<sup>h.</sup> 1	<sup>m.</sup> 7	<sup>h.</sup> 1	<sup>m.</sup> 7	<sup>h.</sup> 1	<sup>m.</sup> 8	
		88 33		88 33		88 33		88 33	
1	12.61	51.25	32.28	44.98	58.25	43.67	25.19	47.53	1
2	13.02	50.93	33.19	44.86	59.19	43.76	25.90	47.75	2
3	13.53	50.65	34.10	44.76	60.07	43.84	26.58	47.96	3
4	14.11	50.35	34.98	44.66	60.91	43.93	27.29	48.15	4
5	14.70	50.09	35.80	44.61	61.72	44.00	28.01	48.34	5
6	15.33	49.85	36.57	44.54	62.51	44.07	28.78	48.52	6
7	15.95	49.63	37.33	44.48	63.30	44.12	29.56	48.71	7
8	16.54	49.45	38.05	44.40	64.12	44.18	30.39	48.91	8
9	17.08	49.25	38.78	44.32	65.95	44.22	31.25	49.13	9
10	17.60	49.05	39.52	44.22	65.82	44.28	32.12	49.35	10
11	18.08	48.86	40.26	44.12	66.75	44.33	32.99	49.61	11
12	18.58	48.64	41.07	44.00	67.70	44.39	33.84	49.89	12
13	19.06	48.41	41.92	43.90	68.69	44.49	34.65	50.18	13
14	19.57	48.19	42.81	43.83	69.71	44.59	35.35	50.47	14
15	20.13	47.95	43.76	43.74	70.70	44.74	36.02	50.77	15
16	20.74	47.71	44.75	43.68	71.67	44.88	36.61	51.05	16
17	21.38	47.47	45.72	43.65	72.57	45.05	37.15	51.31	17
18	22.10	47.25	46.69	43.64	73.41	45.21	37.74	51.55	18
19	22.86	47.04	47.62	43.65	74.18	45.37	38.37	51.79	19
20	23.66	46.85	48.49	43.67	74.92	45.52	39.06	52.02	20
21	24.44	46.68	49.29	43.67	75.65	45.64	39.81	52.25	21
22	25.21	46.52	50.07	43.67	76.41	45.76	40.60	52.53	22
23	25.95	46.39	50.82	43.65	77.24	45.86	41.41	52.80	23
24	26.64	46.26	51.60	43.62	78.11	45.98	42.15	53.13	24
25	27.25	46.14	52.41	43.59	79.05	46.12	42.85	53.46	25
26	27.86	46.00	53.27	43.58	80.01	46.27	43.49	53.80	26
27	28.47	45.86	54.20	43.57	81.00	46.45	44.09	54.13	27
28	29.11	45.66	55.20	43.55	81.95	46.65	44.67	54.47	28
29	29.80	45.49	56.21	43.56	82.83	46.86	45.17	54.78	29
30	30.56	45.30	57.25	43.61	83.67	47.07	45.66	55.10	30
31	31.40	45.13	58.25	43.67	84.45	47.31	46.14	55.40	31
32	32.28	44.98	59.19	43.76	85.19	47.53	46.64	55.71	32



APPARENT PLACES OF  $\alpha$  URSÆ MINORIS, (*Polaris*), FOR THE  
UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		Sidereal Day of the Month.
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	
	<sup>h.</sup> 1	<sup>m.</sup> 8	<sup>h.</sup> 1	<sup>m.</sup> 8	<sup>h.</sup> 1	<sup>m.</sup> 8	<sup>h.</sup> 1	<sup>m.</sup> 8	
		88° 33'		88° 34'		88° 34'		88° 34'	
1	46.64	55.71	58.76	6.27	59.79	18.02	48.39	27.94	1
2	47.15	55.98	59.07	6.61	59.70	18.42	47.76	28.27	2
3	47.70	56.28	59.32	6.98	59.54	18.83	47.13	28.56	3
4	48.28	56.57	59.68	7.35	59.32	19.22	46.37	28.83	4
5	48.90	56.87	59.96	7.77	59.02	19.64	45.62	29.09	5
6	49.53	57.19	60.22	8.18	58.67	20.02	44.90	29.29	6
7	50.17	57.53	60.41	8.61	58.26	20.38	44.23	29.48	7
8	50.79	57.89	60.53	9.02	57.86	20.71	43.62	29.69	8
9	51.36	58.26	60.55	9.44	57.48	21.02	43.08	29.88	9
10	51.85	58.66	60.53	9.85	57.15	21.32	42.61	30.10	10
11	52.28	59.06	60.52	10.24	56.84	21.63	42.04	30.32	11
12	52.65	59.43	60.48	10.61	56.64	21.94	41.46	30.56	12
13	52.93	59.77	60.50	10.93	56.45	22.27	40.84	30.84	13
14	53.21	60.11	60.55	11.29	56.24	22.64	40.14	31.10	14
15	53.53	60.43	60.71	11.63	55.97	23.00	39.34	31.34	15
16	53.90	60.74	60.88	11.99	55.63	23.37	38.62	31.55	16
17	54.38	61.06	61.03	12.37	55.20	23.75	37.75	31.77	17
18	54.87	61.40	61.16	12.77	54.73	24.12	36.90	31.94	18
19	55.40	61.75	61.24	13.21	54.19	24.46	36.09	32.10	19
20	55.88	62.12	61.24	13.62	53.64	24.77	35.29	32.26	20
21	56.34	62.52	61.16	14.05	53.10	25.07	34.50	32.37	21
22	56.72	62.93	61.02	14.44	52.56	25.37	33.77	32.51	22
23	57.05	63.34	60.85	14.83	52.01	25.62	33.06	32.64	23
24	57.31	63.74	60.67	15.22	51.53	25.88	32.42	32.78	24
25	57.52	64.12	60.47	15.57	51.10	26.15	31.75	32.91	25
26	57.71	64.51	60.29	15.93	50.68	26.42	31.10	33.06	26
27	57.89	64.88	60.14	16.25	50.27	26.70	30.40	33.26	27
28	58.07	65.23	60.04	16.61	49.89	26.99	29.68	33.42	28
29	58.26	65.58	59.95	16.92	49.47	27.30	28.84	33.57	29
30	58.49	65.93	59.89	17.28	48.97	27.64	27.92	33.73	30
31	58.76	66.27	59.84	17.65	48.39	27.94	27.00	33.86	31
32	59.07	66.61	59.79	18.02	47.76	28.27	26.04	33.96	32



APPARENT PLACES OF  $\delta$  URSÆ MINORIS, FOR THE  
UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		Sidereal Day of the Month.
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	
	<sup>h.</sup> 18	<sup>m.</sup> 17	<sup>h.</sup> 18	<sup>m.</sup> 17	<sup>h.</sup> 18	<sup>m.</sup> 17	<sup>h.</sup> 18	<sup>m.</sup> 17	
		86° 35'		86° 35'		86° 35'		86° 35'	
1	2.10	59.18	4.93	49.57	12.71	43.59	23.47	42.46	1
2	2.11	58.86	5.10	49.32	13.00	43.45	23.85	42.50	2
3	2.12	58.56	5.27	49.05	13.30	43.30	24.23	42.55	3
4	2.11	58.27	5.44	48.77	13.62	43.14	24.61	42.62	4
5	2.09	57.98	5.63	48.47	13.97	42.98	24.99	42.74	5
6	2.06	57.66	5.84	48.17	14.33	42.84	25.35	42.87	6
7	2.03	57.32	6.08	47.88	14.70	42.73	25.69	43.02	7
8	2.03	56.96	6.35	47.61	15.08	42.65	26.02	43.16	8
9	2.05	56.58	6.63	47.36	15.47	42.61	26.32	43.29	9
10	2.11	56.21	6.91	47.14	15.83	42.57	26.62	43.41	10
11	2.18	55.85	7.17	46.94	16.17	42.55	26.91	43.52	11
12	2.27	55.50	7.43	46.75	16.50	42.51	27.22	43.63	12
13	2.37	55.18	7.68	46.56	16.82	42.47	27.52	43.73	13
14	2.47	54.88	7.92	46.37	17.13	42.42	27.84	43.84	14
15	2.57	54.61	8.16	46.16	17.45	42.36	28.17	43.94	15
16	2.66	54.33	8.40	45.95	17.79	42.30	28.51	44.06	16
17	2.74	54.04	8.65	45.72	18.13	42.22	28.85	44.21	17
18	2.80	53.74	8.92	45.49	18.48	42.16	29.19	44.37	18
19	2.88	53.43	9.19	45.26	18.85	42.11	29.52	44.56	19
20	2.96	53.11	9.50	45.03	19.24	42.08	29.84	44.76	20
21	3.05	52.78	9.81	44.82	19.63	42.06	30.15	44.97	21
22	3.15	52.44	10.13	44.63	20.02	42.06	30.44	45.19	22
23	3.28	52.10	10.48	44.46	20.40	42.08	30.71	45.40	23
24	3.44	51.77	10.82	44.31	20.78	42.13	30.96	45.61	24
25	3.61	51.45	11.15	44.17	21.14	42.19	31.20	45.82	25
26	3.80	51.13	11.49	44.05	21.49	42.25	31.45	46.00	26
27	3.99	50.83	11.81	43.94	21.83	42.31	31.69	46.17	27
28	4.19	50.55	12.12	43.83	22.16	42.37	31.96	46.34	28
29	4.39	50.29	12.41	43.71	22.48	42.40	32.24	46.53	29
30	4.58	50.05	12.71	43.59	22.80	42.43	32.52	46.71	30
31	4.76	49.81	..	..	23.13	42.44	32.81	46.91	31
32	4.93	49.57	..	..	23.47	42.46	33.10	47.16	32



APPARENT PLACES OF  $\delta$  URSÆ MINORIS, FOR THE  
UPPER TRANSIT AT WASHINGTON.

Sideral Day of the Month.	MAY.		JUNE.		JULY.		AUGUST.		Sideral Day of the Month.
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	
	<sup>h.</sup> 18 <sup>m.</sup> 17	<sup>°</sup> 86 <sup>'</sup> 35	<sup>h.</sup> 18 <sup>m.</sup> 17	<sup>°</sup> 86 <sup>'</sup> 35	<sup>h.</sup> 18 <sup>m.</sup> 17	<sup>°</sup> 86 <sup>'</sup> 36	<sup>h.</sup> 18 <sup>m.</sup> 17	<sup>°</sup> 86 <sup>'</sup> 36	
1	32.81	46.91	38.12	55.70	37.52	5.59	31.14	14.64	1
2	33.10	47.16	38.18	56.06	37.37	5.91	30.86	14.86	2
3	33.38	47.41	38.22	56.39	37.22	6.20	30.58	15.08	3
4	33.63	47.70	38.26	56.72	37.07	6.49	30.31	15.31	4
5	33.86	47.98	38.29	57.03	36.92	6.78	30.05	15.54	5
6	34.07	48.27	38.31	57.33	36.79	7.06	29.77	15.78	6
7	34.27	48.53	38.34	57.62	36.66	7.35	29.49	16.04	7
8	34.45	48.78	38.37	57.91	36.54	7.63	29.19	16.30	8
9	34.63	49.02	38.41	58.21	36.41	7.94	28.88	16.57	9
10	34.82	49.25	38.45	58.51	36.28	8.26	28.56	16.84	10
11	35.02	49.47	38.49	58.83	36.13	8.60	28.20	17.09	11
12	35.23	49.70	38.53	59.16	35.97	8.93	27.83	17.33	12
13	35.43	49.94	38.56	59.52	35.77	9.30	27.46	17.53	13
14	35.65	50.20	38.58	59.88	35.58	9.63	27.09	17.72	14
15	35.86	50.47	38.58	60.26	35.35	9.95	26.73	17.89	15
16	36.07	50.76	38.56	60.63	35.11	10.26	26.38	18.04	16
17	36.26	51.06	38.52	60.98	34.87	10.54	26.05	18.19	17
18	36.45	51.39	38.45	61.33	34.63	10.81	25.73	18.37	18
19	36.61	51.72	38.38	61.66	34.41	11.06	25.42	18.57	19
20	36.74	52.04	38.31	61.97	34.20	11.30	25.09	18.78	20
21	36.87	52.37	38.24	62.26	34.00	11.56	24.75	19.00	21
22	36.97	52.68	38.17	62.54	33.81	11.84	24.37	19.23	22
23	37.08	52.97	38.13	62.83	33.61	12.13	23.99	19.44	23
24	37.18	53.24	38.10	63.13	33.39	12.44	23.60	19.63	24
25	37.28	53.50	38.07	63.45	33.17	12.77	23.18	19.81	25
26	37.41	53.77	38.03	63.80	32.91	13.08	22.77	19.96	26
27	37.54	54.04	37.97	64.15	32.63	13.39	22.38	20.09	27
28	37.68	54.33	37.90	64.52	32.34	13.68	21.97	20.21	28
29	37.82	54.64	37.79	64.89	32.03	13.94	21.58	20.32	29
30	37.94	54.99	37.66	65.26	31.73	14.18	21.21	20.43	30
31	38.03	55.33	37.52	65.59	31.43	14.41	20.84	20.55	31
32	38.12	55.70	37.37	65.91	31.14	14.64	20.47	20.68	32



APPARENT PLACES OF  $\delta$  URSÆ MINORIS, FOR THE  
UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		Sidereal Day of the Month.
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	
	h. m.	86° 36'	h. m.	86° 36'	h. m.	86° 36'	h. m.	86° 36'	
1	20.47	20.68	67.91	22.66	55.13	20.11	45.67	13.31	1
2	20.10	20.81	67.50	22.68	54.70	19.95	45.42	12.99	2
3	19.73	20.96	67.07	22.70	54.30	19.78	45.18	12.66	3
4	19.36	21.11	66.62	22.72	53.89	19.58	44.98	12.33	4
5	18.96	21.27	66.16	22.71	53.51	19.37	44.79	12.00	5
6	18.54	21.43	65.69	22.70	53.15	19.14	44.62	11.69	6
7	18.11	21.57	65.23	22.65	52.81	18.92	44.47	11.39	7
8	17.67	21.69	64.78	22.58	52.50	18.69	44.31	11.13	8
9	17.22	21.79	64.33	22.49	52.19	18.49	44.14	10.86	9
10	16.77	21.88	63.90	22.39	51.88	18.29	43.95	10.59	10
11	16.33	21.93	63.48	22.30	51.56	18.10	43.76	10.31	11
12	15.90	21.98	63.10	22.22	51.24	17.96	43.56	10.03	12
13	15.50	22.02	62.72	22.16	50.89	17.79	43.35	9.72	13
14	15.11	22.06	62.34	22.12	50.53	17.60	43.17	9.39	14
15	14.73	22.12	61.95	22.07	50.17	17.40	43.01	9.03	15
16	14.35	22.20	61.52	22.05	49.82	17.17	42.84	8.69	16
17	13.94	22.30	61.09	21.99	49.49	16.92	42.73	8.32	17
18	13.53	22.40	60.64	21.93	49.15	16.64	42.62	7.97	18
19	13.08	22.50	60.19	21.84	48.86	16.36	42.53	7.64	19
20	12.64	22.58	59.75	21.71	48.56	16.09	42.44	7.30	20
21	12.17	22.63	59.32	21.58	48.30	15.82	42.37	6.99	21
22	11.71	22.67	58.89	21.43	48.04	15.56	42.30	6.70	22
23	11.25	22.68	58.50	21.27	47.79	15.32	42.24	6.40	23
24	10.79	22.67	58.13	21.12	47.53	15.07	42.15	6.11	24
25	10.35	22.66	57.76	20.97	47.28	14.84	42.06	5.81	25
26	9.92	22.64	57.39	20.83	47.03	14.61	41.96	5.51	26
27	9.51	22.63	57.03	20.70	46.78	14.39	41.87	5.19	27
28	9.11	22.61	56.66	20.58	46.50	14.16	41.77	4.84	28
29	8.71	22.61	56.29	20.46	46.22	13.86	41.70	4.48	29
30	8.32	22.63	55.92	20.36	45.94	13.56	41.65	4.10	30
31	7.91	22.66	55.52	20.24	45.67	13.31	41.62	3.71	31
32	7.50	22.68	55.13	20.11	45.42	12.99	41.63	3.35	32



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ ANDROMEDÆ.			$\gamma$ PEGASI. (Algenib.)			$\beta$ Hydre.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.
	h. 0	m. 1	° 19'	h. 0	m. 6	° 24'	h. 0	m. 18	° 78' 2"
Jan. 1	9.73	0.14	16.1 0.9	2.27	0.12	26.7 0.8	21.91	0.95	51.4 1.2
11	9.59	0.11	15.2 1.2	2.15	0.10	25.9 0.9	20.96	0.85	50.2 1.7
21	9.48	0.10	14.0 1.4	2.05	0.09	25.0 1.0	20.11	0.76	48.5 2.3
31	9.38	0.08	12.6 1.5	1.96	0.07	24.0 1.0	19.35	0.66	46.2 2.8
Feb. 10	9.30	0.06	11.1 1.6	1.89	0.05	23.0 1.0	18.69	0.53	43.4 3.1
20	9.24	0.04	9.5 1.6	1.84	0.03	22.0 0.9	18.16	0.41	40.3 3.4
March 1	9.20	0.00	7.9 1.5	1.81	0.01	21.1 0.7	17.75	0.27	36.9 3.7
11	9.20	0.05	6.4 1.4	1.82	0.05	20.4 0.5	17.48	0.10	33.2 3.8
21	9.25	0.09	5.0 1.0	1.87	0.08	19.9 0.3	17.38	0.07	29.4 3.9
31	9.34	0.15	4.0 0.7	1.95	0.12	19.6 0.0	17.45	0.24	25.5 4.0
April 10	9.49	0.19	3.3 0.4	2.07	0.17	19.6 0.3	17.69	0.39	21.5 3.7
20	9.68	0.22	2.9 0.1	2.24	0.20	19.9 0.6	18.08	0.55	17.8 3.5
30	9.90	0.27	2.8 0.3	2.44	0.24	20.5 0.8	18.63	0.70	14.3 3.3
May 10	10.17	0.30	3.1 0.6	2.68	0.28	21.3 1.2	19.33	0.80	11.0 2.9
20	10.47	0.33	3.7 1.0	2.96	0.30	22.5 1.5	20.13	0.89	8.1 2.6
30	10.80	0.34	4.7 1.3	3.26	0.32	24.0 1.8	21.02	0.98	5.5 2.1
June 9	11.14	0.35	6.0 1.6	3.58	0.32	25.8 1.9	22.00	1.04	3.4 1.6
19	11.49	0.34	7.6 2.0	3.90	0.33	27.7 2.0	23.04	1.11	1.8 1.2
29	11.83	0.34	9.6 2.3	4.23	0.34	29.7 2.2	24.15	1.11	0.6 0.6
July 9	12.17	0.34	11.9 2.4	4.57	0.30	31.9 2.2	25.26	1.07	0.0 0.2
19	12.51	0.30	14.3 2.6	4.87	0.28	34.1 2.2	26.33	1.03	0.2 0.6
29	12.81	0.26	16.9 2.5	5.15	0.26	36.3 2.1	27.36	0.98	0.8 1.2
Aug. 8	13.07	0.23	19.4 2.6	5.41	0.22	38.4 2.0	28.34	0.82	2.0 1.7
18	13.30	0.20	22.0 2.5	5.63	0.20	40.4 1.9	29.16	0.67	3.7 2.1
28	13.50	0.15	24.5 2.3	5.83	0.15	42.3 1.7	29.83	0.53	5.8 2.4
Sept. 7	13.65	0.11	26.8 2.4	5.98	0.11	44.0 1.6	30.36	0.33	8.2 2.8
17	13.76	0.06	29.2 2.1	6.09	0.06	45.6 1.3	30.69	0.14	11.0 3.1
27	13.82	0.03	31.3 1.9	6.15	0.03	46.9 1.0	30.83	0.06	14.1 3.1
Oct. 7	13.85	0.01	33.2 1.6	6.18	0.00	47.9 0.8	30.77	0.24	17.2 3.0
17	13.84	0.02	34.8 1.3	6.18	0.02	48.7 0.6	30.53	0.42	20.2 2.9
27	13.82	0.06	36.1 1.1	6.16	0.05	49.3 0.3	30.11	0.57	23.1 2.5
Nov. 6	13.76	0.09	37.2 0.8	6.11	0.07	49.6 0.1	29.54	0.71	25.6 2.0
16	13.67	0.11	38.0 0.4	6.04	0.08	49.7 0.0	28.83	0.83	27.6 1.7
26	13.56	0.12	38.4 0.0	5.96	0.09	49.7 0.2	28.00	0.93	29.3 1.1
Dec. 6	13.44	0.12	38.4 0.1	5.87	0.10	49.5 0.3	27.07	0.95	30.4 0.4
16	13.32	0.18	38.3 0.5	5.77	0.11	49.2 0.7	26.12	0.97	30.8 0.2
26	13.19	0.14	37.8 0.8	5.66	0.12	48.5 0.8	25.15	0.96	30.6 0.9
36	13.05		37.0	5.54		47.7	24.19		29.7

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ Cassiopee.				$\beta$ Ceti.				$\delta^1$ Ceti.			
	Right Ascension.		Dec. North.		Right Ascension.		Dec. South.		Right Ascension.		Dec. South.	
	h.	m.	°	'	h.	m.	°	'	h.	m.	°	'
	0	32	55	46	0	36	18	44	1	17	8	53
Jan. 1	35.32	0.27	30.2	0.5	34.42	0.12	82.9	0.4	2.65	0.11	82.8	0.6
11	35.05	0.27	29.7	1.0	34.30	0.11	83.3	0.1	2.54	0.12	83.4	0.5
21	34.78	0.26	28.7	1.3	34.19	0.11	83.4	0.1	2.42	0.12	83.9	0.3
31	34.52	0.22	27.4	1.8	34.08	0.10	83.3	0.4	2.30	0.11	84.2	0.2
Feb. 10	34.30	0.19	25.6	2.2	33.98	0.08	82.9	0.6	2.19	0.10	84.4	0.1
20	34.11	0.14	23.4	2.4	33.90	0.05	82.3	0.9	2.09	0.09	84.3	0.4
March 1	33.97	0.08	21.0	2.5	33.85	0.02	81.4	1.1	2.00	0.06	83.9	0.6
11	33.89	0.01	18.5	2.5	33.83	0.01	80.3	1.4	1.94	0.03	83.3	0.8
21	33.88	0.06	16.0	2.4	33.84	0.05	78.9	1.8	1.91	0.01	82.5	1.0
31	33.94	0.14	13.6	2.2	33.89	0.08	77.1	2.0	1.92	0.04	81.5	1.1
April 10	34.08	0.21	11.4	1.9	33.97	0.13	75.1	2.1	1.96	0.09	80.4	1.5
20	34.29	0.29	9.5	1.6	34.10	0.17	73.0	2.2	2.05	0.14	78.9	1.8
30	34.58	0.34	7.9	1.2	34.27	0.20	70.8	2.3	2.19	0.18	77.1	1.9
May 10	34.92	0.40	6.7	0.6	34.47	0.25	68.5	2.4	2.37	0.21	75.2	2.0
20	35.32	0.44	6.1	0.2	34.72	0.28	66.1	2.4	2.58	0.24	73.2	2.2
30	35.76	0.46	5.9	0.4	35.00	0.31	63.7	2.4	2.82	0.28	71.0	2.3
June 9	36.22	0.49	6.3	0.7	35.31	0.32	61.3	2.2	3.10	0.29	68.7	2.2
19	36.71	0.50	7.0	1.2	35.63	0.32	59.1	2.1	3.39	0.31	66.5	2.1
29	37.21	0.49	8.2	1.6	35.95	0.33	57.0	1.9	3.70	0.32	64.4	2.0
July 9	37.70	0.47	9.8	2.2	36.28	0.32	55.1	1.6	4.02	0.32	62.4	1.9
19	38.17	0.44	12.0	2.5	36.60	0.31	53.5	1.3	4.34	0.31	60.5	1.6
29	38.61	0.41	14.5	2.7	36.91	0.28	52.2	1.1	4.65	0.30	58.9	1.3
Aug. 8	39.02	0.35	17.2	3.0	37.19	0.25	51.1	0.6	4.95	0.27	57.6	1.1
18	39.37	0.31	20.2	3.1	37.44	0.21	50.5	0.2	5.22	0.23	56.5	0.9
28	39.68	0.26	23.3	3.2	37.65	0.19	50.3	0.1	5.45	0.20	55.6	0.5
Sept. 7	39.94	0.20	26.5	3.3	37.84	0.14	50.4	0.3	5.65	0.18	55.1	0.1
17	40.14	0.13	29.8	3.3	37.98	0.10	50.7	0.8	5.83	0.14	55.0	0.2
27	40.27	0.07	33.1	3.2	38.08	0.05	51.5	1.1	5.97	0.11	55.2	0.3
Oct. 7	40.34	0.02	36.3	3.0	38.13	0.02	52.6	1.1	6.08	0.07	55.5	0.7
17	40.36	0.01	39.3	2.7	38.15	0.00	53.7	1.2	6.15	0.04	56.2	0.9
27	40.35	0.08	42.0	2.5	38.15	0.03	54.9	1.3	6.19	0.01	57.1	1.0
Nov. 6	40.27	0.12	44.5	2.2	38.12	0.05	56.2	1.4	6.20	0.02	58.1	1.0
16	40.15	0.18	46.7	1.8	38.07	0.09	57.6	1.3	6.18	0.04	59.1	1.1
26	39.97	0.21	48.5	1.3	37.98	0.10	58.9	1.1	6.14	0.06	60.2	1.1
Dec. 6	39.76	0.22	49.8	0.9	37.88	0.11	60.0	1.0	6.08	0.09	61.3	1.0
	39.54	0.25										
16	39.29	0.27	50.7	0.3	37.77	0.12	61.0	0.8	5.99	0.10	62.3	0.8
26	39.02		51.0	0.2	37.65	0.12	61.8	0.5	5.89	0.11	63.1	0.8
36			50.8		37.53		62.3		5.78		63.9	

NOTE. — Before the 23d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ Eridani. (Achernar.)		$\alpha$ ARIETIS.		$\gamma$ Ceti.	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	<sup>h.</sup> 1 <sup>m.</sup> 32	<sup>°</sup> 57 <sup>'</sup> 56	<sup>h.</sup> 1 <sup>m.</sup> 59	<sup>°</sup> 22 <sup>'</sup> 48	<sup>h.</sup> 2 <sup>m.</sup> 36	<sup>°</sup> 2 <sup>'</sup> 38
Jan. 1	31.39 0.33	66.4 0.3	18.49 0.11	8.0 0.4	4.37 0.10	43.6 0.7
11	31.06 0.34	66.7 0.3	18.38 0.13	7.6 0.5	4.27 0.11	42.9 0.6
21	30.72 0.33	66.4 0.9	18.25 0.14	7.1 0.5	4.16 0.12	42.3 0.6
31	30.39 0.31	65.5 1.3	18.11 0.14	6.6 0.7	4.04 0.13	41.7 0.5
Feb. 10	30.08 0.29	64.2 1.8	17.97 0.14	5.9 0.9	3.91 0.14	41.2 0.4
20	29.79 0.26	62.4 2.3	17.83 0.12	5.0 1.0	3.77 0.14	40.8 0.2
March 1	29.53 0.21	60.1 2.7	17.71 0.10	4.0 1.0	3.63 0.12	40.6 0.1
11	29.32 0.16	57.4 3.0	17.61 0.07	3.0 0.9	3.51 0.09	40.5 0.1
21	29.16 0.09	54.4 3.3	17.54 0.03	2.1 0.8	3.42 0.06	40.6 0.3
31	29.07 0.03	51.1 3.4	17.51 0.01	1.3 0.6	3.36 0.02	40.9 0.5
April 10	29.04 0.04	47.7 3.6	17.52 0.06	0.7 0.4	3.34 0.01	41.4 0.7
20	29.08 0.11	44.1 3.6	17.58 0.12	0.3 0.3	3.35 0.05	42.1 0.8
30	29.19 0.19	40.5 3.5	17.70 0.17	0.0 0.0	3.40 0.09	42.9 1.1
May 10	29.38 0.25	37.0 3.5	17.87 0.20	0.0 0.3	3.49 0.16	44.0 1.3
20	29.63 0.32	33.5 3.3	18.07 0.23	0.3 0.6	3.65 0.21	45.3 1.5
30	29.95 0.37	30.2 3.0	18.30 0.28	0.9 0.9	3.86 0.24	46.8 1.6
June 9	30.32 0.41	27.2 2.7	18.58 0.31	1.8 1.0	4.10 0.26	48.4 1.7
19	30.73 0.44	24.5 2.3	18.89 0.33	2.8 1.2	4.36 0.27	50.1 1.9
29	31.17 0.46	22.2 1.8	19.22 0.34	4.0 1.5	4.63 0.29	52.0 1.9
July 9	31.63 0.47	20.4 1.3	19.56 0.34	5.5 1.8	4.92 0.31	53.9 1.8
19	32.10 0.48	19.1 0.7	19.90 0.34	7.3 1.9	5.23 0.33	55.7 1.6
29	32.58 0.46	18.4 0.1	20.24 0.33	9.2 1.9	5.56 0.31	57.3 1.5
Aug. 8	33.04 0.44	18.3 0.4	20.57 0.31	11.1 1.8	5.87 0.30	58.8 1.4
18	33.48 0.39	18.7 1.1	20.88 0.28	12.9 1.7	6.17 0.28	60.2 1.3
28	33.87 0.34	19.8 1.7	21.16 0.25	14.6 1.7	6.45 0.26	61.5 0.9
Sept. 7	34.21 0.28	21.5 2.1	21.41 0.22	16.3 1.6	6.71 0.23	62.4 0.6
17	34.49 0.21	23.6 2.3	21.63 0.20	17.9 1.5	6.94 0.21	63.0 0.4
27	34.70 0.14	25.9 2.7	21.83 0.18	19.4 1.4	7.15 0.19	63.4 0.1
Oct. 7	34.84 0.08	28.6 3.0	22.01 0.13	20.8 1.2	7.34 0.15	63.5 0.1
17	34.92 0.01	31.6 2.9	22.14 0.10	22.0 0.9	7.49 0.12	63.4 0.3
27	34.91 0.06	34.5 2.9	22.24 0.07	22.9 0.8	7.61 0.09	63.1 0.4
Nov. 6	34.85 0.12	37.4 2.7	22.31 0.03	23.7 0.7	7.70 0.07	62.7 0.6
16	34.73 0.19	40.1 2.5	22.34 0.01	24.4 0.6	7.77 0.04	62.1 0.7
26	34.54 0.24	42.6 2.1	22.35 0.02	25.0 0.3	7.81 0.00	61.4 0.7
Dec. 6	34.30 0.27	44.7 1.6	22.33 0.06	25.3 0.1	7.81 0.02	60.7 0.8
16	34.03 0.31	46.3 1.1	22.27 0.08	25.4 0.1	7.79 0.05	59.9 0.9
26	33.72 0.34	47.4 0.6	22.19 0.10	25.3 0.3	7.74 0.09	59.0 0.8
36	33.38	48.0	22.09	25.0	7.65	58.2

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ CETI.		$\alpha$ PERSEI.		$\gamma$ Tauri.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	<sup>h.</sup> 2 <sup>m.</sup> 54	<sup>°</sup> 3 <sup>'</sup> 32	<sup>h.</sup> 3 <sup>m.</sup> 14	<sup>°</sup> 49 <sup>'</sup> 21	<sup>h.</sup> 3 <sup>m.</sup> 39	<sup>°</sup> 23 <sup>'</sup> 40
Jan. 1	<sup>s.</sup> 59.34 <sup>s.</sup> 0.08	<sup>"</sup> 23.2 <sup>"</sup> 0.7	<sup>s.</sup> 22.82 <sup>s.</sup> 0.14	<sup>"</sup> 52.1 <sup>"</sup> 0.9	<sup>s.</sup> 11.91 <sup>s.</sup> 0.06	<sup>"</sup> 21.0 <sup>"</sup> 0.0
11	59.26   0.11	22.5   0.7	22.68   0.17	53.0   0.6	11.85   0.09	21.0   0.1
21	59.15   0.13	21.8   0.6	22.51   0.21	53.6   0.3	11.76   0.12	20.9   0.2
31	59.02   0.14	21.2   0.5	22.30   0.24	53.9   0.1	11.64   0.15	20.7   0.3
Feb. 10	58.88   0.15	20.7   0.3	22.06   0.25	53.8   0.6	11.49   0.16	20.4   0.4
20	58.73   0.18	20.4   0.3	21.81   0.24	53.2   1.0	11.33   0.18	20.0   0.6
March 1	58.60   0.13	20.1   0.2	21.57   0.23	52.2   1.3	11.15   0.16	19.4   0.6
11	58.47   0.11	19.9   0.1	21.34   0.19	50.9   1.5	10.99   0.14	18.8   0.6
21	58.36   0.08	20.0   0.2	21.15   0.15	49.4   1.5	10.85   0.12	18.2   0.6
31	58.28   0.04	20.2   0.4	21.00   0.10	47.9   1.7	10.73   0.08	17.6   0.6
April 10	58.24   0.00	20.6   0.6	20.90   0.03	46.2   1.8	10.65   0.03	17.0   0.5
20	58.24   0.05	21.2   0.9	20.87   0.03	44.4   1.8	10.62   0.01	16.5   0.5
30	58.29   0.09	22.1   1.1	20.90   0.11	42.6   1.7	10.63   0.04	16.0   0.3
May 10	58.38   0.13	23.2   1.2	21.01   0.17	40.9   1.5	10.67   0.11	15.7   0.0
20	58.51   0.18	24.4   1.3	21.18   0.23	39.4   1.3	10.78   0.17	15.7   0.1
30	58.69   0.22	25.7   1.4	21.41   0.30	38.1   0.9	10.95   0.21	15.8   0.3
June 9	58.91   0.24	27.1   1.7	21.71   0.34	37.2   0.6	11.16   0.24	16.1   0.5
19	59.15   0.27	28.8   1.8	22.05   0.37	36.6   0.4	11.40   0.26	16.6   0.6
29	59.42   0.29	30.6   1.8	22.42   0.41	36.2   0.0	11.66   0.30	17.2   0.7
July 9	59.71   0.31	32.4   1.7	22.83   0.44	36.2   0.4	11.96   0.32	17.9   0.9
19	60.02   0.30	34.1   1.6	23.27   0.46	36.6   0.5	12.28   0.34	18.8   1.1
29	60.32   0.32	35.7   1.5	23.73   0.46	37.1   0.9	12.62   0.35	19.9   1.2
Aug. 8	60.64   0.30	37.2   1.3	24.19   0.45	38.0   1.2	12.97   0.33	21.1   1.1
18	60.94   0.30	38.5   1.2	24.64   0.43	39.2   1.5	13.30   0.32	22.2   1.1
28	61.24   0.27	39.7   1.0	25.07   0.40	40.7   1.7	13.62   0.31	23.3   1.1
Sept. 7	61.51   0.25	40.7   0.6	25.47   0.38	42.4   1.8	13.93   0.30	24.4   1.1
17	61.76   0.22	41.3   0.4	25.85   0.36	44.2   1.9	14.23   0.28	25.5   1.0
27	61.98   0.20	41.7   0.1	26.21   0.34	46.1   2.1	14.51   0.26	26.5   0.9
Oct. 7	62.18   0.17	41.8   0.1	26.55   0.30	48.2   2.1	14.77   0.24	27.4   0.8
17	62.35   0.15	41.7   0.3	26.85   0.24	50.3   2.2	15.01   0.21	28.2   0.7
27	62.50   0.12	41.4   0.4	27.09   0.19	52.5   2.2	15.22   0.17	28.9   0.7
Nov. 6	62.62   0.08	41.0   0.6	27.28   0.16	54.7   2.1	15.39   0.14	29.6   0.5
16	62.70   0.05	40.4   0.7	27.44   0.11	56.8   1.9	15.53   0.12	30.1   0.3
26	62.75   0.02	39.7   0.8	27.55   0.04	58.7   1.8	15.65   0.08	30.4   0.3
Dec. 6	62.77   0.01	38.9   0.8	27.59   0.00	60.5   1.7	15.73   0.03	30.7   0.2
16	62.76   0.04	38.1   0.8	27.59   0.06	62.2   1.4	15.76   0.00	30.9   0.2
26	62.72   0.07	37.3   0.8	27.53   0.12	63.6   1.1	15.76   0.05	31.1   0.1
36	62.65	36.5	27.41	64.7	15.71	31.2

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\gamma^1$ Eridani.		$\alpha$ TAURI. (Aldebaran.)		$\alpha$ AURIGÆ. (Capella.)	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	h. m.	° ' "	h. m.	° ' "	h. m.	° ' "
	3 51	13 54	4 27	16 13	5 6	45 51
Jan. 1	31.70 0.07	31.6 1.4	55.47 0.08	36.8 0.3	24.00 0.00	14.9 1.3
11	31.63 0.11	33.0 1.2	55.44 0.06	36.5 0.3	24.00 0.06	16.2 1.1
21	31.52 0.18	34.2 0.9	55.38 0.09	36.2 0.2	23.94 0.11	17.3 1.0
31	31.39 0.15	35.1 0.6	55.29 0.13	36.0 0.3	23.83 0.16	18.3 0.7
Feb. 10	31.24 0.17	35.7 0.4	55.16 0.15	35.7 0.4	23.67 0.21	19.0 0.4
20	31.07 0.17	36.1 0.2	55.01 0.17	35.3 0.3	23.46 0.24	19.4 0.2
March 1	30.90 0.17	36.3 0.2	54.84 0.17	35.0 0.3	23.22 0.25	19.6 0.1
11	30.73 0.15	36.1 0.5	54.67 0.16	34.7 0.3	22.97 0.24	19.5 0.5
21	30.58 0.13	35.6 0.3	54.51 0.14	34.4 0.2	22.73 0.22	19.0 0.8
31	30.45 0.10	34.8 1.1	54.37 0.11	34.2 0.2	22.51 0.18	18.2 1.0
April 10	30.35 0.07	33.7 1.3	54.26 0.08	34.0 0.1	22.33 0.15	17.2 1.1
20	30.28 0.02	32.4 1.6	54.18 0.03	33.9 0.1	22.18 0.10	16.1 1.3
30	30.26 0.02	30.8 1.3	54.15 0.01	33.8 0.1	22.08 0.04	14.8 1.4
May 10	30.28 0.06	29.0 2.0	54.16 0.05	33.9 0.2	22.04 0.01	13.4 1.4
20	30.34 0.12	27.0 2.2	54.21 0.11	34.1 0.4	22.05 0.09	12.0 1.5
30	30.46 0.16	24.8 2.3	54.32 0.16	34.5 0.5	22.14 0.15	10.5 1.4
June 9	30.62 0.19	22.5 2.3	54.48 0.19	35.0 0.6	22.29 0.20	9.1 1.2
19	30.81 0.22	20.2 2.2	54.67 0.21	35.6 0.3	22.49 0.24	7.9 1.1
29	31.03 0.26	18.0 2.1	54.88 0.24	36.4 0.3	22.73 0.29	6.8 0.9
July 9	31.29 0.28	15.9 2.0	55.12 0.28	37.2 0.9	23.02 0.33	5.9 0.7
19	31.57 0.30	13.9 1.8	55.40 0.31	38.1 1.1	23.35 0.36	5.2 0.6
29	31.87 0.31	12.1 1.6	55.71 0.32	39.2 1.0	23.71 0.40	4.6 0.3
Aug. 8	32.18 0.30	10.5 1.3	56.03 0.32	40.2 0.9	24.11 0.41	4.3 0.1
18	32.48 0.29	9.2 1.0	56.35 0.31	41.1 0.8	24.52 0.43	4.2 0.1
28	32.77 0.28	8.2 0.6	56.66 0.31	41.9 0.9	24.95 0.43	4.3 0.2
Sept. 7	33.05 0.27	7.6 0.1	56.97 0.30	42.8 0.6	25.38 0.42	4.5 0.3
17	33.32 0.27	7.5 0.3	57.27 0.29	43.4 0.3	25.80 0.41	4.8 0.7
27	33.59 0.25	7.8 0.6	57.56 0.28	43.7 0.3	26.21 0.40	5.5 0.8
Oct. 7	33.84 0.22	8.4 1.0	57.84 0.26	44.0 0.1	26.61 0.39	6.3 0.9
17	34.06 0.18	9.4 1.4	58.10 0.24	44.1 0.1	27.00 0.37	7.2 1.0
27	34.24 0.15	10.8 1.6	58.34 0.21	44.2 0.1	27.37 0.34	8.2 1.1
Nov. 6	34.39 0.12	12.4 1.3	58.55 0.19	44.1 0.2	27.71 0.30	9.3 1.2
16	34.51 0.10	14.2 1.8	58.74 0.16	43.9 0.2	28.01 0.26	10.5 1.4
26	34.61 0.08	16.0 1.3	58.90 0.12	43.7 0.3	28.27 0.20	11.9 1.5
Dec. 6	34.69 0.02	17.8 1.3	59.02 0.08	43.4 0.4	28.47 0.16	13.4 1.4
16	34.71 0.03	19.6 1.3	59.10 0.05	43.0 0.3	28.63 0.10	14.8 1.4
26	34.68 0.06	21.4 1.6	59.15 0.01	42.7 0.2	28.73 0.03	16.2 1.3
36	34.62	23.0	59.14	42.5	28.76	17.5

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.



**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sidereal Day of the Month.	$\beta$ ORIONIS. (Rigel.)			$\beta$ TAURI.			$\delta$ ORIONIS.		
	Right Ascension.		Dec. South.	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.
	h. m.	s.	° ' "	h. m.	s.	° ' "	h. m.	s.	° ' "
	5	7	8 21	5 17		28 29	5 24		0 24
Jan. 1	50.65	0.01	56.2 1.6	29.01	0.03	14.1 0.4	53.42	0.01	17.5 1.2
11	50.64	0.05	57.8 1.4	29.04	0.03	14.5 0.3	53.43	0.03	18.7 1.1
21	50.59	0.09	59.2 1.2	29.01	0.06	14.8 0.3	53.40	0.06	19.8 1.0
31	50.50	0.13	60.4 0.9	28.93	0.11	15.1 0.2	53.34	0.10	20.8 0.8
Feb. 10	50.37	0.15	61.3 0.7	28.82	0.15	15.3 0.1	53.24	0.14	21.6 0.6
20	50.22	0.16	62.0 0.5	28.67	0.18	15.4 0.0	53.10	0.16	22.2 0.4
March 1	50.06	0.17	62.5 0.2	28.49	0.18	15.4 0.1	52.94	0.17	22.6 0.2
11	49.89	0.17	62.7 0.1	28.31	0.19	15.3 0.3	52.77	0.17	22.8 0.1
21	49.72	0.16	62.6 0.3	28.12	0.18	15.0 0.4	52.60	0.16	22.9 0.1
31	49.56	0.15	62.3 0.5	27.94	0.16	14.6 0.5	52.44	0.14	22.8 0.3
April 10	49.41	0.12	61.8 0.8	27.79	0.12	14.1 0.6	52.30	0.11	22.5 0.5
20	49.29	0.08	61.0 1.0	27.67	0.08	13.5 0.5	52.19	0.09	22.0 0.6
30	49.21	0.04	60.0 1.3	27.59	0.03	13.0 0.6	52.10	0.05	21.4 0.8
May 10	49.17	0.01	58.7 1.5	27.56	0.01	12.4 0.5	52.05	0.00	20.6 1.0
20	49.18	0.04	57.2 1.6	27.57	0.05	11.9 0.4	52.05	0.04	19.6 1.3
30	49.22	0.09	55.6 1.7	27.62	0.11	11.5 0.4	52.09	0.07	18.3 1.3
June 9	49.31	0.13	53.9 1.8	27.73	0.16	11.1 0.3	52.16	0.12	17.0 1.4
19	49.44	0.16	52.1 2.0	27.89	0.20	10.8 0.1	52.28	0.16	15.6 1.4
29	49.60	0.20	50.1 1.9	28.09	0.24	10.7 0.0	52.44	0.20	14.2 1.4
July 9	49.80	0.23	48.2 1.8	28.33	0.27	10.7 0.0	52.64	0.22	12.8 1.4
19	50.03	0.25	46.4 1.6	28.60	0.30	10.7 0.1	52.86	0.24	11.4 1.4
29	50.28	0.27	44.8 1.5	28.90	0.31	10.8 0.1	53.10	0.25	10.0 1.2
Aug. 8	50.55	0.28	43.3 1.3	29.21	0.33	10.9 0.2	53.35	0.28	8.8 1.0
18	50.83	0.29	42.0 1.1	29.54	0.33	11.1 0.3	53.63	0.30	7.8 0.9
28	51.12	0.30	40.9 0.6	29.87	0.34	11.4 0.3	53.93	0.30	6.9 0.8
Sept. 7	51.42	0.29	40.3 0.2	30.21	0.34	11.7 0.4	54.23	0.29	6.3 0.8
17	51.71	0.29	40.1 0.1	30.55	0.33	12.1 0.4	54.52	0.28	6.0 0.1
27	52.00	0.28	40.2 0.3	30.88	0.33	12.5 0.3	54.80	0.28	6.1 0.3
Oct. 7	52.28	0.26	40.5 0.8	31.21	0.32	12.8 0.3	55.08	0.28	6.4 0.6
17	52.54	0.25	41.3 1.2	31.53	0.30	13.1 0.2	55.36	0.27	7.0 0.9
27	52.79	0.23	42.5 1.4	31.83	0.28	13.3 0.3	55.63	0.25	7.9 1.2
Nov. 6	53.02	0.20	43.9 1.6	32.11	0.25	13.6 0.4	55.88	0.22	9.1 1.3
16	53.22	0.17	45.5 1.8	32.36	0.23	14.0 0.3	56.10	0.19	10.4 1.3
26	53.39	0.14	47.3 1.8	32.59	0.20	14.3 0.3	56.29	0.16	11.7 1.4
Dec. 6	53.53	0.10	49.1 1.9	32.79	0.14	14.6 0.3	56.45	0.13	13.1 1.4
16	53.63	0.06	51.0 1.8	32.93	0.09	14.9 0.3	56.58	0.08	14.5 1.5
26	53.69	0.02	52.8 1.7	33.02	0.06	15.2 0.4	56.66	0.04	16.0 1.4
36	53.71		54.5	33.08		15.6	56.70		17.4

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;



**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sidereal Day of the Month.	α Leporis.		α ORIONIS.		α Columbae.	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.
	<sup>h.</sup> 5 <sup>m.</sup> 26	<sup>°</sup> 17 <sup>'</sup> 55	<sup>h.</sup> 5 <sup>m.</sup> 29	<sup>°</sup> 1 <sup>'</sup> 17	<sup>h.</sup> 5 <sup>m.</sup> 34	<sup>°</sup> 34 <sup>'</sup> 8
Jan. 1	<sup>s.</sup> 35.46 <sup>s.</sup> 0.01	<sup>s.</sup> 28.3 <sup>s.</sup> 2.1	<sup>s.</sup> 8.71 <sup>s.</sup> 0.02	<sup>s.</sup> 36.1 <sup>s.</sup> 1.3	<sup>s.</sup> 37.09 <sup>s.</sup> 0.03	<sup>s.</sup> 61.1 <sup>s.</sup> 2.7
11	35.45 0.04	30.4 1.9	8.73 0.02	37.4 1.2	37.06 0.07	63.8 2.5
21	35.41 0.09	32.3 1.5	8.71 0.07	38.6 1.0	36.99 0.13	66.3 2.1
31	35.32 0.13	33.8 1.2	8.64 0.10	39.6 0.8	36.86 0.17	68.4 1.7
Feb. 10	35.19 0.15	35.0 1.0	8.54 0.14	40.4 0.6	36.69 0.20	70.1 1.3
20	35.04 0.18	36.0 0.7	8.40 0.16	41.0 0.5	36.49 0.22	71.4 0.8
March 1	34.86 0.19	36.7 0.3	8.24 0.17	41.5 0.2	36.27 0.23	72.2 0.4
11	34.67 0.19	37.0 0.0	8.07 0.17	41.7 0.0	36.04 0.24	72.6 0.0
21	34.48 0.19	37.0 0.4	7.90 0.17	41.7 0.1	35.80 0.23	72.6 0.5
31	34.29 0.17	36.6 0.7	7.73 0.15	41.6 0.3	35.57 0.21	72.1 0.9
April 10	34.12 0.14	35.9 1.0	7.58 0.12	41.3 0.5	35.36 0.19	71.2 1.3
20	33.98 0.10	34.9 1.3	7.46 0.06	40.8 0.7	35.17 0.15	69.9 1.7
30	33.88 0.06	33.6 1.6	7.38 0.04	40.1 0.9	35.02 0.12	68.2 2.0
May 10	33.82 0.08	32.0 1.8	7.34 0.01	39.2 1.0	34.90 0.06	66.2 2.3
20	33.79 0.02	30.2 1.9	7.33 0.03	38.2 1.1	34.84 0.02	63.9 2.5
30	33.81 0.06	28.3 2.0	7.36 0.07	37.1 1.3	34.82 0.03	61.4 2.7
June 9	33.87 0.10	26.3 2.2	7.43 0.12	35.8 1.4	34.85 0.08	58.7 2.8
19	33.97 0.14	24.1 2.4	7.55 0.15	34.4 1.5	34.93 0.12	55.9 3.0
29	34.11 0.18	21.7 2.3	7.70 0.19	32.9 1.5	35.05 0.17	52.9 2.9
July 9	34.29 0.21	19.4 2.1	7.89 0.22	31.4 1.4	35.22 0.20	50.0 2.7
19	34.50 0.24	17.3 2.0	8.11 0.24	30.0 1.4	35.42 0.24	47.3 2.4
29	34.74 0.27	15.3 1.9	8.35 0.25	28.6 1.3	35.66 0.27	44.9 2.2
Aug. 8	35.01 0.28	13.4 1.5	8.60 0.27	27.3 1.1	35.93 0.29	42.7 1.8
18	35.29 0.28	11.9 1.1	8.87 0.29	26.2 0.9	36.22 0.31	40.9 1.4
28	35.57 0.29	10.8 0.8	9.16 0.30	25.3 0.5	36.53 0.32	39.5 1.0
Sept. 7	35.86 0.29	10.0 0.3	9.46 0.29	24.8 0.2	36.85 0.32	38.5 0.4
17	36.15 0.30	9.7 0.2	9.75 0.29	24.6 0.0	37.17 0.32	38.1 0.4
27	36.45 0.29	9.9 0.6	10.04 0.29	24.6 0.3	37.49 0.32	38.5 0.9
Oct. 7	36.74 0.28	10.5 1.0	10.33 0.28	24.9 0.6	37.81 0.30	39.4 1.4
17	37.02 0.26	11.5 1.5	10.61 0.26	25.5 0.9	38.11 0.29	40.8 1.8
27	37.28 0.24	13.0 1.8	10.87 0.24	26.4 1.2	38.40 0.26	42.6 2.1
Nov. 6	37.52 0.22	14.8 2.0	11.11 0.22	27.6 1.3	38.66 0.23	44.7 2.6
16	37.74 0.19	16.8 2.3	11.33 0.20	28.9 1.5	38.89 0.19	47.3 3.0
26	37.93 0.16	19.1 2.4	11.53 0.17	30.4 1.5	39.08 0.16	50.3 3.0
Dec. 6	38.09 0.11	21.5 2.4	11.70 0.13	31.9 1.5	39.24 0.10	53.3 3.1
16	38.20 0.06	23.9 2.4	11.83 0.08	33.4 1.5	39.34 0.05	56.4 3.0
26	38.26 0.01	26.3 2.2	11.91 0.05	34.9 1.4	39.39 0.00	59.4 2.9
36	38.27	28.5	11.96	36.3	39.39	62.3

after the 22d of March it begins at the Sideral Oh. *before* the Mean Noon.



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ ORIONIS.		$\mu$ Geminorum.		$\alpha$ Argus. (Canopus.)	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.
	h. m.	°	h. m.	°	h. m.	°
	5 47	7 22	6 14	22 34	6 20	52 36
Jan. 1	37.74 0.04	43.1 0.9	31.86 0.08	57.9 0.0	53.31 0.03	70.8 3.3
11	37.78 0.00	42.2 0.8	31.94 0.03	57.9 0.0	53.28 0.10	74.1 3.2
21	37.78 0.04	41.4 0.7	31.97 0.03	57.9 0.1	53.18 0.17	77.3 3.0
31	37.74 0.09	40.7 0.6	31.94 0.07	58.0 0.1	53.01 0.23	80.3 2.8
Feb. 10	37.65 0.13	40.1 0.4	31.87 0.11	58.1 0.1	52.78 0.27	82.9 2.1
20	37.52 0.15	39.7 0.2	31.76 0.15	58.2 0.1	52.51 0.31	85.0 1.5
March 1	37.37 0.17	39.5 0.2	31.61 0.17	58.3 0.1	52.20 0.34	86.5 1.1
11	37.20 0.17	39.3 0.1	31.44 0.18	58.4 0.0	51.86 0.36	87.6 0.5
21	37.03 0.17	39.2 0.0	31.26 0.18	58.4 0.1	51.50 0.36	88.1 0.0
31	36.86 0.15	39.2 0.1	31.08 0.17	58.3 0.1	51.14 0.35	88.1 0.5
April 10	36.71 0.12	39.3 0.2	30.91 0.14	58.2 0.2	50.79 0.32	87.6 1.0
20	36.59 0.10	39.5 0.3	30.77 0.11	58.0 0.1	50.47 0.28	86.6 1.5
30	36.49 0.06	39.8 0.4	30.66 0.07	57.9 0.2	50.19 0.24	85.1 2.0
May 10	36.43 0.01	40.2 0.6	30.59 0.08	57.7 0.2	49.95 0.20	83.1 2.3
20	36.42 0.03	40.8 0.7	30.56 0.00	57.5 0.2	49.75 0.15	80.8 2.5
30	36.45 0.06	41.5 0.8	30.56 0.04	57.3 0.1	49.60 0.09	78.3 2.8
June 9	36.51 0.10	42.3 0.9	30.60 0.08	57.2 0.1	49.51 0.02	75.5 3.0
19	36.61 0.14	43.2 0.9	30.68 0.14	57.1 0.0	49.49 0.05	72.5 3.2
29	36.75 0.18	44.1 1.0	30.82 0.18	57.1 0.1	49.54 0.10	69.3 3.3
July 9	36.93 0.21	45.1 1.0	31.00 0.21	57.0 0.0	49.64 0.16	66.0 3.0
19	37.14 0.25	46.1 0.9	31.21 0.24	57.0 0.1	49.80 0.22	63.0 2.8
29	37.39 0.26	47.0 0.8	31.45 0.26	57.1 0.0	50.02 0.27	60.2 2.7
Aug. 8	37.65 0.27	47.8 0.8	31.71 0.28	57.1 0.1	50.29 0.30	57.5 2.4
18	37.92 0.28	48.6 0.6	31.99 0.29	57.2 0.0	50.59 0.34	55.1 2.0
28	38.20 0.29	49.2 0.4	32.28 0.31	57.2 0.1	50.93 0.36	53.1 1.5
Sept. 7	38.49 0.30	49.6 0.1	32.59 0.32	57.1 0.1	51.29 0.40	51.6 0.7
17	38.79 0.30	49.7 0.0	32.91 0.33	57.0 0.1	51.69 0.41	50.9 0.1
27	39.09 0.30	49.7 0.2	33.24 0.33	56.9 0.2	52.10 0.42	50.8 0.4
Oct. 7	39.39 0.29	49.5 0.5	33.57 0.32	56.7 0.3	52.52 0.40	51.2 1.2
17	39.68 0.28	49.0 0.7	33.89 0.32	56.4 0.5	52.92 0.39	52.4 1.8
27	39.96 0.26	48.3 0.9	34.21 0.31	55.9 0.5	53.31 0.36	54.2 2.3
Nov. 6	40.22 0.25	47.4 1.0	34.52 0.29	55.4 0.4	53.67 0.32	56.5 2.8
16	40.47 0.22	46.4 1.0	34.81 0.26	55.0 0.3	53.99 0.28	59.3 3.2
26	40.69 0.20	45.4 1.1	35.07 0.24	54.7 0.3	54.27 0.21	62.5 3.4
Dec. 6	40.89 0.15	44.3 1.0	35.31 0.20	54.4 0.3	54.48 0.16	65.9 3.6
16	41.04 0.11	43.3 1.0	35.51 0.15	54.1 0.2	54.64 0.09	69.5 3.6
26	41.15 0.06	42.3 1.0	35.66 0.10	53.9 0.1	54.73 0.01	73.1 3.5
36	41.21	41.3	35.76	53.8	54.74	76.6

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. after the Mean Noon;



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	51 (Hév.) Cephei.		α CANIS MAJORIS. (Sirius.)		ε Canis Majoris.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.
	<sup>h.</sup> 6	<sup>m.</sup> 33	<sup>h.</sup> 6	<sup>m.</sup> 38	<sup>h.</sup> 6	<sup>m.</sup> 53
	<sup>°</sup> 87	<sup>'</sup> 14	<sup>°</sup> 16	<sup>'</sup> 31	<sup>°</sup> 28	<sup>'</sup> 46
Jan. 1	75.87 0.42	59.1 3.2	60.95 0.06	32.7 2.4	9.57 0.07	60.1 2.9
11	76.29 0.50	62.3 3.1	61.01 0.02	35.1 2.2	9.64 0.01	63.0 2.7
21	75.79 1.38	65.4 2.9	61.03 0.03	37.3 1.9	9.65 0.04	65.7 2.5
31	74.41 2.19	68.3 2.6	61.00 0.07	39.2 1.8	9.61 0.09	68.2 2.3
Feb. 10	72.22 2.92	70.9 2.3	60.93 0.12	41.0 1.4	9.52 0.13	70.5 1.9
20	69.30 3.51	73.2 1.7	60.81 0.15	42.4 1.0	9.39 0.16	72.4 1.6
March 1	65.79 3.92	74.9 1.1	60.66 0.17	43.4 0.8	9.23 0.19	74.0 1.1
11	61.87 4.17	76.0 0.6	60.49 0.18	44.2 0.4	9.04 0.21	75.1 0.7
21	57.70 4.26	76.6 0.0	60.31 0.19	44.6 0.1	8.83 0.22	75.8 0.2
31	53.44 4.15	76.6 0.6	60.12 0.18	44.7 0.2	8.61 0.21	76.0 0.1
April 10	49.29 3.39	76.0 1.2	59.94 0.17	44.5 0.5	8.40 0.19	75.9 0.5
20	45.40 3.47	74.8 1.6	59.77 0.14	44.0 0.8	8.21 0.18	75.4 1.0
30	41.93 2.94	73.2 2.2	59.63 0.11	43.2 1.1	8.03 0.15	74.4 1.4
May 10	38.99 2.29	71.0 2.6	59.52 0.08	42.1 1.3	7.88 0.11	73.0 1.5
20	36.70 1.59	68.4 2.8	59.44 0.04	40.8 1.5	7.77 0.07	71.5 1.8
30	35.11 0.81	65.6 3.0	59.40 0.00	39.3 1.8	7.70 0.03	69.7 2.1
June 9	34.30 0.03	62.6 3.1	59.40 0.04	37.5 1.9	7.67 0.01	67.6 2.3
19	34.27 0.74	59.5 3.3	59.44 0.07	35.6 1.9	7.68 0.05	65.3 2.5
29	35.01 1.52	56.2 3.2	59.51 0.11	33.7 2.0	7.73 0.09	62.8 2.5
July 9	36.53 2.25	53.0 3.0	59.62 0.15	31.7 1.9	7.82 0.12	60.3 2.5
19	38.78 2.93	50.0 2.8	59.77 0.17	29.8 1.9	7.94 0.16	57.8 2.4
29	41.71 3.55	47.2 2.5	59.94 0.20	27.9 1.7	8.10 0.20	55.4 2.2
Aug. 8	45.26 4.09	44.7 2.2	60.14 0.22	26.2 1.5	8.30 0.22	53.2 1.9
18	49.35 4.53	42.5 2.0	60.36 0.25	24.7 1.3	8.52 0.25	51.3 1.6
28	53.88 4.90	40.5 1.7	60.61 0.27	23.4 0.8	8.77 0.27	49.7 1.3
Sept. 7	58.78 5.19	38.8 1.1	60.88 0.29	22.6 0.4	9.04 0.29	48.4 0.7
17	63.97 5.40	37.7 0.6	61.17 0.30	22.2 0.0	9.33 0.31	47.7 0.2
27	69.37 5.48	37.1 0.1	61.47 0.30	22.2 0.4	9.64 0.32	47.5 0.3
Oct. 7	74.85 5.44	37.0 0.3	61.77 0.30	22.6 0.8	9.96 0.32	47.8 0.3
17	80.29 5.28	37.3 0.7	62.07 0.30	23.4 1.5	10.28 0.32	48.6 1.4
27	85.57 4.99	38.0 1.2	62.37 0.28	24.9 1.8	10.60 0.31	50.0 1.9
Nov. 6	90.56 4.60	39.2 1.7	62.65 0.27	26.7 1.9	10.91 0.28	51.9 2.1
16	95.16 4.07	40.9 2.2	62.92 0.24	28.6 2.2	11.19 0.26	54.0 2.6
26	99.23 3.44	43.1 2.6	63.16 0.22	30.8 2.4	11.45 0.23	56.6 2.9
Dec. 6	102.67 2.70	45.7 2.7	63.38 0.19	33.2 2.6	11.68 0.20	59.5 3.0
16	105.37 1.37	48.4 3.0	63.57 0.14	35.8 2.6	11.88 0.15	62.5 3.1
26	107.24 0.98	51.4 3.2	63.71 0.09	38.4 2.4	12.03 0.09	65.6 3.0
36	108.22	54.6	63.80	40.8	12.12	68.6

after the 23d of March it begins at the Sidereal Oh. before the Mean Noon.



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sideral Day of the Month.	$\delta$ Geminorum.		$\alpha^3$ GEMINORUM. (Castor.)		$\alpha$ CANIS MINORIS. (Procyon.)	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	h. m.		h. m.		h. m.	
	7 11	22 14	7 25	32 11	7 31	5 34
Jan. 1	48.04 0.14	12.5 0.2	42.11 0.16	28.4 0.4	60.45 0.14	52.9 1.3
11	48.18 0.08	12.3 0.1	42.27 0.11	28.8 0.5	60.59 0.09	51.6 1.2
21	48.26 0.03	12.2 0.1	42.38 0.04	29.3 0.7	60.68 0.04	50.4 1.0
31	48.29 0.03	12.3 0.1	42.42 0.01	30.0 0.7	60.72 0.01	49.4 0.8
Feb. 10	48.26 0.07	12.4 0.2	42.41 0.07	30.7 0.7	60.71 0.05	48.6 0.7
20	48.19 0.11	12.6 0.3	42.34 0.11	31.4 0.7	60.66 0.10	47.9 0.4
March 1	48.08 0.14	12.9 0.3	42.23 0.15	32.1 0.6	60.56 0.13	47.5 0.3
11	47.94 0.16	13.2 0.2	42.08 0.18	32.7 0.5	60.43 0.15	47.2 0.2
21	47.78 0.18	13.4 0.2	41.90 0.19	33.2 0.4	60.28 0.16	47.0 0.0
31	47.60 0.17	13.6 0.1	41.71 0.19	33.6 0.2	60.12 0.16	47.0 0.0
April 10	47.43 0.16	13.7 0.1	41.52 0.18	33.8 0.1	59.96 0.15	47.0 0.2
20	47.27 0.14	13.8 0.0	41.34 0.15	33.9 0.1	59.81 0.14	47.2 0.3
30	47.13 0.11	13.8 0.0	41.19 0.13	33.8 0.3	59.67 0.11	47.5 0.4
May 10	47.02 0.08	13.8 0.0	41.06 0.10	33.5 0.4	59.56 0.09	47.9 0.5
20	46.94 0.04	13.8 0.0	40.96 0.06	33.1 0.5	59.47 0.06	48.4 0.6
30	46.90 0.00	13.8 0.1	40.90 0.02	32.6 0.6	59.41 0.02	49.0 0.6
June 9	46.90 0.04	13.7 0.3	40.88 0.02	32.0 0.7	59.39 0.01	49.6 0.6
19	46.94 0.06	13.4 0.3	40.90 0.07	31.3 0.8	59.40 0.05	50.2 0.7
29	47.00 0.11	13.1 0.2	40.97 0.11	30.5 0.8	59.45 0.07	50.9 0.7
July 9	47.11 0.15	12.9 0.2	41.08 0.15	29.7 0.8	59.52 0.12	51.6 0.7
19	47.26 0.20	12.7 0.2	41.23 0.18	28.9 0.9	59.64 0.15	52.3 0.6
29	47.46 0.22	12.5 0.3	41.41 0.21	28.0 0.9	59.79 0.17	52.9 0.6
Aug. 8	47.68 0.23	12.2 0.3	41.62 0.24	27.1 0.8	59.96 0.20	53.5 0.4
18	47.91 0.25	11.9 0.3	41.86 0.27	26.3 0.9	60.16 0.22	53.9 0.3
28	48.16 0.28	11.6 0.4	42.13 0.30	25.4 0.9	60.38 0.24	54.2 0.0
Sep <sup>r</sup> 7	48.44 0.30	11.2 0.5	42.43 0.31	24.5 0.9	60.62 0.26	54.2 0.1
17	48.74 0.31	10.7 0.7	42.74 0.32	23.6 0.9	60.88 0.28	54.1 0.4
27	49.05 0.32	10.0 0.7	43.06 0.34	22.7 0.9	61.16 0.29	53.7 0.7
Oct. 7	49.37 0.33	9.3 0.7	43.40 0.36	21.8 0.8	61.45 0.30	53.0 0.9
17	49.70 0.33	8.6 0.7	43.76 0.38	21.0 0.8	61.75 0.30	52.1 1.1
27	50.03 0.33	7.9 0.8	44.14 0.37	20.2 0.7	62.05 0.31	51.0 1.2
Nov. 6	50.36 0.32	7.1 0.9	44.51 0.35	19.5 0.6	62.36 0.31	49.8 1.4
16	50.68 0.31	6.2 0.8	44.86 0.34	18.9 0.5	62.67 0.29	48.4 1.6
26	50.99 0.29	5.4 0.7	45.20 0.31	18.4 0.2	62.96 0.27	46.8 1.6
Dec. 6	51.28 0.25	4.7 0.6	45.51 0.29	18.2 0.1	63.23 0.24	45.2 1.6
16	51.53 0.20	4.1 0.4	45.80 0.24	18.1 0.0	63.47 0.21	43.6 1.5
26	51.73 0.16	3.7 0.3	46.04 0.19	18.1 0.3	63.68 0.16	42.1 1.4
36	51.89	3.4	46.23	18.4	63.84	40.7

NOTE. — Before the 22d of March the Sideral day of the Month begins at the Sideral Oh. after the Mean Noon;



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sideral Day of the Month.	$\beta$ Geminorum. (Pollux.)		15 Argus.		$\epsilon$ Hydræ.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.
	<sup>h.</sup> 7 <sup>m.</sup> 36	<sup>°</sup> 28 <sup>'</sup> 21	<sup>h.</sup> 8 <sup>m.</sup> 1	<sup>°</sup> 23 <sup>'</sup> 54	<sup>h.</sup> 8 <sup>m.</sup> 39	<sup>°</sup> 6 <sup>'</sup> 55
	<sup>s.</sup> 47.20   0.16	<sup>"</sup> 37.7   0.1	<sup>s.</sup> 36.92   0.15	<sup>"</sup> 7.1   3.0	<sup>s.</sup> 23.68   0.20	<sup>"</sup> 46.4   1.5
Jan. 1	47.20   0.16	37.7   0.1	36.92   0.15	7.1   3.0	23.68   0.20	46.4   1.5
11	47.36   0.11	37.8   0.3	37.07   0.10	10.1   2.8	23.88   0.16	44.9   1.2
21	47.47   0.06	38.1   0.4	37.17   0.04	12.9   2.6	24.04   0.11	43.7   1.0
31	47.53   0.00	38.5   0.5	37.21   0.01	15.5   2.4	24.15   0.06	42.7   0.8
Feb. 10	47.53   0.05	39.0   0.6	37.20   0.06	17.9   2.2	24.21   0.00	41.9   0.6
20	47.48   0.10	39.6   0.5	37.14   0.10	20.1   1.8	24.21   0.04	41.3   0.5
March 1	47.38   0.14	40.1   0.5	37.04   0.13	21.9   1.5	24.17   0.08	40.8   0.3
11	47.24   0.16	40.6   0.5	36.91   0.16	23.4   1.1	24.09   0.11	40.5   0.1
21	47.08   0.18	41.1   0.4	36.75   0.18	24.5   0.7	23.98   0.13	40.4   0.1
31	46.90   0.18	41.5   0.3	36.57   0.19	25.2   0.3	23.85   0.14	40.5   0.2
April 10	46.72   0.17	41.8   0.2	36.38   0.18	25.5   0.0	23.71   0.14	40.7   0.2
20	46.55   0.16	42.0   0.0	36.20   0.16	25.5   0.3	23.57   0.14	40.9   0.3
30	46.39   0.13	42.0   0.1	36.04   0.15	25.2   0.7	23.43   0.13	41.2   0.4
May 10	46.26   0.10	41.9   0.2	35.89   0.14	24.5   1.0	23.30   0.11	41.6   0.4
20	46.16   0.07	41.7   0.4	35.75   0.12	23.5   1.3	23.19   0.09	42.0   0.5
30	46.09   0.02	41.3   0.5	35.63   0.08	22.2   1.4	23.10   0.07	42.5   0.5
June 9	46.07   0.01	40.8   0.5	35.55   0.04	20.8   1.8	23.03   0.04	43.0   0.5
19	46.08   0.05	40.3   0.5	35.51   0.00	19.0   2.0	22.99   0.01	43.5   0.6
29	46.13   0.08	39.8   0.6	35.51   0.03	17.0   2.0	22.98   0.03	44.1   0.5
July 9	46.21   0.13	39.2   0.6	35.54   0.06	15.0   2.1	23.01   0.06	44.6   0.4
19	46.34   0.17	38.6   0.7	35.60   0.09	12.9   2.2	23.07   0.09	45.0   0.4
29	46.51   0.20	37.9   0.7	35.69   0.14	10.7   2.0	23.16   0.12	45.4   0.3
Aug. 8	46.71   0.23	37.2   0.7	35.83   0.17	8.7   1.8	23.28   0.13	45.7   0.2
18	46.94   0.24	36.5   0.8	36.00   0.19	6.9   1.6	23.41   0.17	45.9   0.0
28	47.18   0.28	35.7   0.8	36.19   0.22	5.3   1.3	23.58   0.20	45.9   0.1
Sept. 7	47.46   0.30	34.9   0.9	36.41   0.24	4.0   0.9	23.78   0.22	45.8   0.4
17	47.76   0.31	34.0   0.9	36.65   0.27	3.1   0.4	24.00   0.23	45.4   0.6
27	48.07   0.32	33.1   1.0	36.92   0.29	2.7   0.0	24.23   0.25	44.8   0.7
Oct. 7	48.39   0.34	32.1   1.0	37.21   0.30	2.7   0.5	24.48   0.29	44.1   1.1
17	48.73   0.35	31.1   0.9	37.51   0.33	3.2   1.0	24.77   0.32	43.0   1.3
27	49.08   0.36	30.2   0.9	37.84   0.33	4.2   1.5	25.09   0.33	41.7   1.5
Nov. 6	49.44   0.35	29.3   0.8	38.17   0.32	5.7   1.9	25.42   0.32	40.2   1.6
16	49.79   0.33	28.5   0.7	38.49   0.31	7.6   2.3	25.74   0.32	38.6   1.7
26	50.12   0.31	27.8   0.6	38.80   0.28	9.9   2.6	26.06   0.31	36.9   1.8
Dec. 6	50.43   0.29	27.2   0.4	39.08   0.25	12.5   2.8	26.37   0.29	35.1   1.7
16	50.72   0.24	26.8   0.2	39.33   0.22	15.3   3.0	26.66   0.26	33.4   1.7
26	50.96   0.19	26.6   0.0	39.55   0.18	18.3   3.0	26.92   0.22	31.7   1.5
36	51.15	26.6	39.73	21.3	27.14	30.2

after the 22d of March it begins at the Sideral Oh. before the Mean Noon.



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	♌ Ursæ Majoris.		♐ Argus.		♒ HYDRÆ.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.
	h. m. 8 49	° ′ 48 34	h. m. 9 13	° ′ 58 41	h. m. 9 20	° ′ 8 3
Jan. 1	39.31 0.80	69.4 1.0	22.53 0.28	7.9 3.7	44.17 0.23	14.1 2.3
11	39.61 0.23	70.4 1.2	22.81 0.20	11.6 3.8	44.40 0.19	16.4 2.2
21	39.84 0.17	71.6 1.4	23.01 0.11	15.4 3.9	44.59 0.14	18.6 2.1
31	40.01 0.09	73.0 1.6	23.12 0.03	19.3 3.9	44.73 0.09	20.7 1.9
Feb. 10	40.10 0.02	74.6 1.7	23.15 0.06	23.2 3.7	44.82 0.04	22.6 1.6
20	40.12 0.06	76.3 1.7	23.09 0.12	26.9 3.4	44.86 0.00	24.2 1.2
March 1	40.06 0.12	78.0 1.6	22.97 0.19	30.3 3.1	44.86 0.05	25.4 1.0
11	39.94 0.17	79.6 1.5	22.78 0.25	33.4 2.7	44.81 0.08	26.4 0.8
21	39.77 0.21	81.1 1.4	22.53 0.29	36.1 2.3	44.73 0.11	27.2 0.7
31	39.56 0.23	82.5 1.0	22.24 0.32	38.4 1.9	44.62 0.12	27.9 0.4
April 10	39.33 0.24	83.5 0.7	21.92 0.33	40.3 1.4	44.50 0.13	28.3 0.1
20	39.09 0.24	84.2 0.4	21.59 0.37	41.7 0.8	44.37 0.14	28.4 0.2
30	38.85 0.22	84.6 0.0	21.22 0.37	42.5 0.3	44.23 0.14	28.2 0.4
May 10	38.63 0.20	84.6 0.3	20.85 0.34	42.8 0.1	44.09 0.12	27.8 0.5
20	38.43 0.17	84.3 0.7	20.51 0.31	42.7 0.7	43.97 0.10	27.3 0.6
30	38.26 0.13	83.6 1.0	20.20 0.29	42.0 1.1	43.87 0.08	26.7 0.8
June 9	38.13 0.09	82.6 1.2	19.91 0.26	40.9 1.6	43.79 0.07	25.9 0.9
19	38.04 0.05	81.4 1.4	19.65 0.22	39.3 2.1	43.72 0.05	25.0 0.9
29	37.99 0.00	80.0 1.6	19.43 0.17	37.2 2.4	43.67 0.02	24.1 1.1
July 9	37.99 0.05	78.4 1.9	19.26 0.12	34.8 2.5	43.65 0.01	23.0 1.1
19	38.04 0.09	76.5 2.0	19.14 0.05	32.3 2.8	43.66 0.04	21.9 1.2
29	38.13 0.14	74.5 2.1	19.09 0.00	29.5 2.9	43.70 0.06	20.7 1.1
Aug. 8	38.27 0.19	72.4 2.2	19.09 0.08	26.6 2.9	43.76 0.09	19.6 1.1
18	38.46 0.22	70.2 2.2	19.17 0.14	23.7 2.9	43.85 0.12	18.5 0.8
28	38.68 0.25	68.0 2.2	19.31 0.20	20.8 2.6	43.97 0.15	17.7 0.5
Sept. 7	38.93 0.30	65.8 2.2	19.51 0.28	18.2 2.3	44.12 0.19	17.2 0.3
17	39.23 0.35	63.6 2.1	19.79 0.34	15.9 1.8	44.31 0.20	16.9 0.0
27	39.58 0.37	61.5 2.0	20.13 0.38	14.1 1.5	44.51 0.24	16.9 0.3
Oct. 7	39.95 0.40	59.5 1.8	20.51 0.44	12.6 0.8	44.75 0.27	17.2 0.6
17	40.35 0.43	57.7 1.6	20.95 0.48	11.8 0.1	45.02 0.29	17.8 1.1
27	40.78 0.45	56.1 1.4	21.43 0.50	11.7 0.4	45.31 0.30	18.9 1.5
Nov. 6	41.23 0.45	54.7 1.2	21.93 0.50	12.1 1.2	45.61 0.32	20.4 1.7
16	41.68 0.46	53.5 0.9	22.43 0.51	13.3 1.7	45.93 0.34	22.1 1.7
26	42.14 0.44	52.6 0.4	22.94 0.48	15.0 2.4	46.27 0.33	23.8 2.1
Dec. 6	42.58 0.41	52.2 0.0	23.42 0.44	17.4 2.3	46.60 0.30	25.9 2.3
16	42.99 0.38	52.2 0.3	23.86 0.38	20.2 3.1	46.90 0.29	28.2 2.5
26	43.37 0.33	52.5 0.7	24.24 0.31	23.3 3.6	47.19 0.24	30.7 2.3
36	43.70	53.2	24.55	26.9	47.43	33.0

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	♂ Ursæ Majoris.		♂ Leonis.		α LEONIS. (Regulus.)	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	h. m.	52° 18'	h. m.	24° 24'	h. m.	12° 38'
	9 23	52° 18'	9 37	24 24	10 0	12 38
Jan. 1	31.39 0.26	33.9 0.8	56.01 0.28	52.8 0.7	56.54 0.28	52.7 1.4
11	31.75 0.29	34.7 1.1	56.29 0.24	52.1 0.5	56.82 0.24	51.3 1.2
21	32.04 0.21	35.8 1.5	56.53 0.19	51.6 0.1	57.06 0.19	50.1 1.0
31	32.25 0.13	37.3 1.8	56.72 0.13	51.5 0.1	57.25 0.14	49.1 0.7
Feb. 10	32.38 0.06	39.1 1.9	56.85 0.07	51.6 0.4	57.39 0.09	48.4 0.4
20	32.44 0.01	41.0 2.0	56.92 0.01	52.0 0.6	57.48 0.04	48.0 0.1
March 1	32.43 0.09	43.0 1.9	56.93 0.03	52.6 0.7	57.52 0.00	47.9 0.0
11	32.34 0.15	44.9 1.8	56.90 0.07	53.3 0.8	57.52 0.05	47.9 0.2
21	32.19 0.19	46.7 1.7	56.83 0.10	54.1 0.8	57.47 0.08	48.1 0.5
31	32.00 0.23	48.4 1.4	56.73 0.12	54.9 0.8	57.39 0.10	48.6 0.5
April 10	31.77 0.25	49.8 1.0	56.61 0.13	55.7 0.7	57.29 0.11	49.1 0.5
20	31.52 0.26	50.8 0.7	56.48 0.15	56.4 0.7	57.18 0.12	49.6 0.4
30	31.26 0.26	51.5 0.3	56.33 0.15	57.1 0.6	57.06 0.13	50.0 0.5
May 10	31.00 0.24	51.8 0.1	56.18 0.13	57.7 0.4	56.93 0.12	50.5 0.6
20	30.76 0.21	51.7 0.4	56.05 0.12	58.1 0.2	56.81 0.11	51.1 0.5
30	30.55 0.18	51.3 0.8	55.93 0.10	58.3 0.1	56.70 0.10	51.6 0.5
June 9	30.37 0.15	50.5 1.1	55.83 0.08	58.4 0.1	56.60 0.08	52.1 0.4
19	30.22 0.10	49.4 1.4	55.75 0.05	58.3 0.2	56.52 0.06	52.5 0.2
29	30.12 0.05	48.0 1.8	55.70 0.02	58.1 0.4	56.46 0.04	52.7 0.1
July 9	30.07 0.00	46.2 2.0	55.68 0.01	57.7 0.5	56.42 0.01	52.8 0.1
19	30.07 0.03	44.2 2.2	55.69 0.03	57.2 0.7	56.41 0.02	52.9 0.0
29	30.10 0.09	42.0 2.4	55.72 0.05	56.5 0.9	56.43 0.04	52.9 0.1
Aug. 8	30.19 0.14	39.6 2.5	55.77 0.09	55.6 0.9	56.47 0.06	52.8 0.3
18	30.33 0.18	37.1 2.5	55.86 0.13	54.7 1.1	56.53 0.08	52.5 0.6
28	30.51 0.22	34.6 2.6	55.99 0.16	53.6 1.3	56.61 0.12	51.9 0.7
Sept. 7	30.73 0.27	32.0 2.5	56.15 0.18	52.3 1.4	56.73 0.15	51.2 0.9
17	31.00 0.31	29.5 2.5	56.33 0.20	50.9 1.5	56.88 0.17	50.3 1.0
27	31.31 0.35	27.0 2.4	56.53 0.24	49.4 1.7	57.05 0.21	49.3 1.1
Oct. 7	31.66 0.40	24.6 2.3	56.77 0.28	47.7 1.8	57.26 0.25	48.2 1.4
17	32.06 0.44	22.3 2.1	57.05 0.31	45.9 1.8	57.51 0.27	46.8 1.7
27	32.50 0.46	20.2 1.8	57.36 0.34	44.1 1.9	57.78 0.31	45.1 1.8
Nov. 6	32.96 0.48	18.4 1.5	57.70 0.35	42.2 1.8	58.09 0.32	43.3 1.9
16	33.44 0.48	16.9 1.1	58.05 0.35	40.4 1.7	58.41 0.34	41.4 2.0
26	33.92 0.47	15.8 0.8	58.40 0.35	38.7 1.6	58.75 0.34	39.4 2.0
Dec. 6	34.39 0.46	15.0 0.3	58.75 0.34	37.1 1.5	59.09 0.33	37.4 1.8
16	34.85 0.42	14.7 0.1	59.09 0.33	35.6 1.2	59.42 0.32	35.6 1.7
26	35.27 0.39	14.8 0.6	59.42 0.29	34.4 0.9	59.74 0.29	33.9 1.6
36	35.66	15.4	59.71	33.5	60.03	32.3

after the 22d of March it begins at the Sidereal Ch. before the Mean Noon.



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\gamma$ Argus.		$\alpha$ URSE MAJORIS.		$\delta$ LEONIS.	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	h. m.	$^{\circ}$ $'$	h. m.	$^{\circ}$ $'$	h. m.	$^{\circ}$ $'$
	10 39	58 56	10 55	62 29	11 6	21 16
Jan. 1	39.60 0.42	43.9 3.1	6.44 0.54	60.4 0.4	41.06 0.33	72.6 1.3
11	40.02 0.36	47.0 3.4	6.98 0.49	60.8 0.9	41.39 0.29	71.3 1.1
21	40.38 0.29	50.4 3.7	7.47 0.43	61.7 1.3	41.68 0.26	70.2 0.8
31	40.67 0.22	54.1 3.8	7.90 0.34	63.0 1.7	41.94 0.21	69.4 0.3
Feb. 10	40.89 0.13	57.9 3.9	8.24 0.24	64.7 2.2	42.15 0.16	69.1 0.0
20	41.02 0.06	61.8 3.7	8.48 0.15	66.9 2.5	42.31 0.12	69.1 0.3
March 1	41.08 0.02	65.5 3.5	8.63 0.06	69.4 2.6	42.43 0.06	69.4 0.5
11	41.06 0.08	69.0 3.3	8.68 0.04	72.0 2.6	42.49 0.02	69.9 0.7
21	40.98 0.15	72.3 3.1	8.64 0.14	74.6 2.5	42.51 0.02	70.6 1.0
31	40.83 0.19	75.4 2.7	8.50 0.20	77.1 2.3	42.49 0.05	71.6 1.0
April 10	40.64 0.23	78.1 2.3	8.30 0.24	79.4 2.0	42.44 0.07	72.6 1.0
20	40.41 0.26	80.4 1.9	8.06 0.31	81.4 1.8	42.37 0.10	73.6 1.0
30	40.15 0.29	82.3 1.4	7.75 0.33	83.2 1.4	42.27 0.11	74.6 0.9
May 10	39.86 0.29	83.7 0.9	7.42 0.34	84.6 0.8	42.16 0.11	75.5 0.9
20	39.57 0.31	84.6 0.3	7.08 0.36	85.4 0.3	42.05 0.12	76.4 0.8
30	39.26 0.31	84.9 0.1	6.72 0.34	85.7 0.1	41.93 0.11	77.2 0.5
June 9	38.95 0.30	84.8 0.6	6.38 0.31	85.6 0.6	41.82 0.11	77.7 0.4
19	38.65 0.28	84.2 0.9	6.07 0.29	85.0 1.0	41.71 0.10	78.1 0.2
29	38.37 0.25	83.3 1.4	5.78 0.25	84.0 1.6	41.61 0.09	78.3 0.0
July 9	38.12 0.21	81.9 1.9	5.53 0.21	82.4 1.9	41.52 0.07	78.3 0.2
19	37.91 0.18	80.0 2.4	5.32 0.16	80.5 2.2	41.45 0.04	78.1 0.5
29	37.73 0.14	77.6 2.6	5.16 0.12	78.3 2.6	41.41 0.02	77.6 0.7
Aug. 8	37.59 0.06	75.0 2.7	5.04 0.06	75.7 2.9	41.39 0.00	76.9 0.7
18	37.53 0.00	72.3 2.7	4.99 0.01	72.8 3.1	41.39 0.02	76.2 1.0
28	37.53 0.05	69.6 2.7	5.00 0.08	69.7 3.2	41.41 0.04	75.2 1.2
Sept. 7	37.58 0.14	66.9 2.6	5.08 0.14	66.5 3.3	41.45 0.09	74.0 1.4
17	37.72 0.21	64.3 2.5	5.22 0.20	63.2 3.3	41.54 0.12	72.6 1.7
27	37.93 0.29	61.8 2.2	5.42 0.28	59.9 3.3	41.66 0.16	70.9 1.9
Oct. 7	38.22 0.34	59.6 1.6	5.70 0.34	56.6 3.3	41.82 0.20	69.0 2.0
17	38.56 0.41	58.0 1.1	6.04 0.42	53.3 3.1	42.02 0.24	67.0 2.1
27	38.97 0.46	56.9 0.5	6.46 0.47	50.2 2.9	42.26 0.26	64.9 2.3
Nov. 6	39.43 0.50	56.4 0.1	6.93 0.52	47.3 2.5	42.52 0.30	62.6 2.3
16	39.93 0.54	56.5 0.7	7.45 0.57	44.8 2.1	42.82 0.34	60.3 2.3
26	40.47 0.54	57.2 1.4	8.02 0.59	42.7 1.8	43.16 0.35	58.0 2.3
Dec. 6	41.01 0.53	58.6 2.0	8.61 0.60	40.9 1.1	43.51 0.35	55.7 2.0
16	41.54 0.50	60.6 2.4	9.21 0.60	39.8 0.6	43.86 0.35	53.7 1.7
26	42.04 0.45	63.0 2.9	9.81 0.56	39.2 0.0	44.21 0.34	52.0 1.5
36	42.49	65.9	10.37	39.2	44.55	50.5

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\delta$ Hydræ et Crateris.		$\beta$ LEONIS.		$\gamma$ URSE MAJORIS	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	<sup>h.</sup> <sup>m.</sup> 11 12	<sup>°</sup> <sup>'</sup> 14 1	<sup>h.</sup> <sup>m.</sup> 11 41	<sup>°</sup> <sup>'</sup> 15 20	<sup>h.</sup> <sup>m.</sup> 11 46	<sup>°</sup> <sup>'</sup> 54 27
Jan. 1	<sup>s.</sup> 21.79 0.32	<sup>s.</sup> 18.3 2.5	<sup>s.</sup> 56.20 0.33	<sup>s.</sup> 64.9 1.8	<sup>s.</sup> 28.88 0.48	<sup>s.</sup> 61.1 0.7
11	22.11 0.28	20.8 2.5	56.53 0.31	63.1 1.5	29.36 0.45	60.4 0.0
21	22.39 0.24	23.3 2.3	56.84 0.28	61.6 1.1	29.81 0.41	60.4 0.6
31	22.63 0.20	25.6 2.2	57.12 0.24	60.5 0.7	30.22 0.35	61.0 1.1
Feb. 10	22.83 0.16	27.8 2.0	57.36 0.19	59.8 0.4	30.57 0.28	62.1 1.6
20	22.99 0.11	29.8 1.9	57.55 0.14	59.4 0.2	30.85 0.21	63.7 1.9
March 1	23.10 0.06	31.7 1.7	57.69 0.10	59.2 0.1	31.06 0.13	65.6 2.2
11	23.16 0.03	33.4 1.3	57.79 0.06	59.3 0.4	31.19 0.06	67.8 2.4
21	23.19 0.01	34.7 1.0	57.85 0.01	59.7 0.7	31.25 0.01	70.2 2.6
31	23.18 0.04	35.7 0.8	57.86 0.01	60.4 0.9	31.24 0.07	72.8 2.5
April 10	23.14 0.06	36.5 0.6	57.85 0.04	61.3 0.9	31.17 0.12	75.3 2.3
20	23.08 0.09	37.1 0.4	57.81 0.08	62.2 0.9	31.05 0.18	77.6 2.1
30	22.99 0.10	37.5 0.2	57.73 0.09	63.1 0.9	30.87 0.21	79.7 1.8
May 10	22.89 0.10	37.7 0.1	57.64 0.09	64.0 0.9	30.66 0.23	81.5 1.5
20	22.79 0.10	37.6 0.4	57.55 0.10	64.9 0.8	30.43 0.24	83.0 1.0
30	22.69 0.11	37.2 0.5	57.45 0.11	65.7 0.7	30.19 0.25	84.0 0.6
June 9	22.58 0.10	36.7 0.6	57.34 0.10	66.4 0.6	29.94 0.25	84.6 0.2
19	22.48 0.10	36.1 0.8	57.24 0.10	67.0 0.4	29.69 0.25	84.8 0.3
29	22.38 0.09	35.3 0.9	57.14 0.10	67.4 0.2	29.44 0.23	84.5 0.7
July 9	22.29 0.07	34.4 1.0	57.04 0.08	67.6 0.1	29.21 0.20	83.8 1.2
19	22.22 0.05	33.4 1.0	56.96 0.07	67.7 0.0	29.01 0.17	82.6 1.5
29	22.17 0.04	32.4 1.1	56.89 0.05	67.7 0.2	28.84 0.14	81.1 2.0
Aug. 8	22.13 0.02	31.3 1.1	56.84 0.03	67.5 0.5	28.70 0.11	79.1 2.3
18	22.11 0.02	30.2 1.0	56.81 0.02	67.0 0.7	28.59 0.08	76.8 2.6
28	22.13 0.04	29.2 0.8	56.79 0.01	66.3 0.9	28.51 0.03	74.2 2.8
Sept. 7	22.17 0.08	28.4 0.6	56.80 0.03	65.4 1.1	28.48 0.02	71.4 3.1
17	22.25 0.10	27.8 0.4	56.83 0.09	64.3 1.3	28.50 0.09	68.3 3.2
27	22.35 0.15	27.4 0.1	56.92 0.12	63.0 1.5	28.59 0.14	65.1 3.2
Oct. 7	22.50 0.19	27.3 0.2	57.04 0.16	61.5 1.8	28.73 0.19	61.9 3.4
17	22.69 0.23	27.5 0.4	57.20 0.20	59.7 2.0	28.92 0.27	58.5 3.5
27	22.92 0.27	27.9 0.9	57.40 0.23	57.7 2.1	29.19 0.33	55.0 3.3
Nov. 6	23.19 0.30	28.8 1.3	57.63 0.27	55.6 2.2	29.52 0.37	51.7 3.0
16	23.49 0.32	30.1 1.7	57.90 0.31	53.4 2.3	29.89 0.42	48.7 2.7
26	23.81 0.33	31.8 1.9	58.21 0.32	51.1 2.3	30.31 0.46	46.0 2.5
Dec. 6	24.14 0.34	33.7 2.1	58.53 0.34	48.8 2.2	30.77 0.47	43.5 1.9
16	24.48 0.35	35.8 2.3	58.87 0.35	46.6 2.1	31.24 0.50	41.6 1.4
26	24.83 0.33	38.1 2.4	59.22 0.34	44.5 2.0	31.74 0.49	40.2 0.8
36	25.16	40.5	59.56	42.5	32.23	39.4

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\beta$ Chamaeleontis.		$\alpha^1$ Crucis.		$\beta$ Corvi.	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.
	h. m.	$^{\circ}$ $'$	h. m.	$^{\circ}$ $'$	h. m.	$^{\circ}$ $'$
	12 10	78 31	12 18	62 19	12 27	22 37
Jan. 1	12.55 1.20	51.6 1.9	50.50 0.59	8.3 2.1	2.97 0.33	18.9 2.3
11	13.75 1.10	53.5 2.4	51.09 0.54	10.4 2.5	3.30 0.34	21.2 2.4
21	14.85 0.98	55.9 2.8	51.63 0.50	12.9 2.9	3.64 0.31	23.6 2.4
31	15.83 0.85	58.7 3.2	52.13 0.43	15.8 3.2	3.95 0.28	26.0 2.4
Feb. 10	16.68 0.69	61.9 3.6	52.56 0.36	19.0 3.4	4.23 0.24	28.4 2.3
20	17.37 0.51	65.5 3.8	52.92 0.30	22.4 3.6	4.47 0.19	30.7 2.3
March 1	17.88 0.35	69.3 4.0	53.22 0.22	26.0 3.6	4.66 0.15	33.0 2.1
11	18.23 0.20	73.3 3.9	53.44 0.14	29.6 3.5	4.81 0.11	35.1 1.8
21	18.43 0.04	77.2 3.7	53.58 0.06	33.1 3.4	4.92 0.07	36.9 1.5
31	18.47 0.12	80.9 3.6	53.64 0.00	36.5 3.2	4.99 0.04	38.4 1.3
April 10	18.35 0.27	84.5 3.4	53.64 0.06	39.7 2.9	5.03 0.01	39.7 1.2
20	18.08 0.42	87.9 3.3	53.58 0.11	42.6 2.6	5.04 0.02	40.9 1.0
30	17.66 0.54	91.2 2.9	53.47 0.17	45.2 2.4	5.02 0.05	41.9 0.7
May 10	17.12 0.65	94.1 2.4	53.30 0.21	47.6 2.1	4.97 0.07	42.6 0.4
20	16.47 0.76	96.5 1.9	53.09 0.25	49.7 1.7	4.90 0.07	43.0 0.2
30	15.71 0.83	98.4 1.4	52.84 0.29	51.4 1.2	4.83 0.09	43.2 0.0
June 9	14.88 0.87	99.8 0.9	52.55 0.30	52.6 0.7	4.74 0.10	43.2 0.3
19	14.01 0.89	100.7 0.5	52.25 0.32	53.3 0.2	4.64 0.12	42.9 0.5
29	13.12 0.90	101.2 0.1	51.93 0.32	53.5 0.3	4.52 0.12	42.4 0.7
July 9	12.22 0.87	101.1 0.7	51.61 0.32	53.2 0.9	4.40 0.11	41.7 0.8
19	11.35 0.84	100.4 1.2	51.29 0.30	52.3 1.3	4.29 0.09	40.9 0.8
29	10.51 0.76	99.2 1.7	50.99 0.28	51.0 1.8	4.20 0.09	40.1 1.1
Aug. 8	9.75 0.63	97.5 2.2	50.71 0.24	49.2 2.1	4.11 0.08	39.0 1.2
18	9.12 0.50	95.3 2.5	50.47 0.19	47.1 2.3	4.03 0.07	37.8 1.2
28	8.62 0.36	92.8 2.8	50.28 0.12	44.8 2.5	3.96 0.04	36.6 1.1
Sept. 7	8.26 0.16	90.0 2.9	50.16 0.04	42.3 2.6	3.92 0.00	35.5 1.1
17	8.10 0.05	87.1 3.1	50.12 0.02	39.7 2.8	3.92 0.04	34.4 1.0
27	8.15 0.25	84.0 2.9	50.14 0.13	36.9 2.6	3.96 0.07	33.4 0.7
Oct. 7	8.40 0.45	81.1 2.7	50.27 0.22	34.3 2.4	4.03 0.12	32.7 0.5
17	8.85 0.66	78.4 2.5	50.49 0.31	31.9 2.0	4.15 0.18	32.2 0.2
27	9.51 0.88	75.9 2.1	50.80 0.39	29.9 1.6	4.33 0.22	32.0 0.0
Nov. 6	10.34 0.99	73.8 1.6	51.19 0.45	28.3 1.1	4.55 0.25	32.0 0.6
16	11.33 1.12	72.2 1.1	51.64 0.52	27.2 0.6	4.80 0.31	32.6 1.1
26	12.45 1.21	71.1 0.4	52.16 0.56	26.6 0.1	5.11 0.34	33.7 1.4
Dec. 6	13.66 1.24	70.7 0.2	52.72 0.60	26.7 0.5	5.45 0.35	35.1 1.7
16	14.90 1.27	70.9 1.0	53.32 0.62	27.2 1.2	5.80 0.36	36.8 1.9
26	16.17 1.23	71.9 1.6	53.94 0.60	28.4 1.7	6.16 0.35	38.7 2.1
36	17.40	73.5	54.54	30.1	6.51	40.8

NOTE.— Before the 23d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon ;



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	12 Canum Venaticorum.		α VIRGINIS. (Spica.)		γ URSÆ MAJORIS.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.
	<sup>h.</sup> <sup>m.</sup> 12 49	<sup>°</sup> <sup>'</sup> 39 3	<sup>h.</sup> <sup>m.</sup> 13 17	<sup>°</sup> <sup>'</sup> 10 25	<sup>h.</sup> <sup>m.</sup> 13 42	<sup>°</sup> <sup>'</sup> 50 0
Jan. 1	<sup>s.</sup> <sup>s.</sup> 29.32 0.39	<sup>"</sup> <sup>"</sup> 70.5 1.7	<sup>s.</sup> <sup>s.</sup> 49.80 0.35	<sup>"</sup> <sup>"</sup> 51.5 2.1	<sup>s.</sup> <sup>s.</sup> 1.66 0.44	<sup>"</sup> <sup>"</sup> 24.0 2.0
11	29.71 0.38	68.8 1.1	50.15 0.33	53.6 2.0	2.10 0.45	22.0 1.4
21	30.09 0.37	67.7 0.6	50.48 0.32	55.6 2.0	2.55 0.43	20.6 0.7
31	30.46 0.34	67.1 0.0	50.80 0.29	57.6 1.9	2.98 0.41	19.9 0.2
Feb. 10	30.80 0.29	67.1 0.5	51.09 0.28	59.5 1.7	3.39 0.37	19.7 0.5
20	31.09 0.22	67.6 0.9	51.35 0.23	61.2 1.5	3.76 0.33	20.2 1.0
March 1	31.31 0.19	68.5 1.3	51.58 0.19	62.7 1.3	4.08 0.27	21.2 1.5
11	31.50 0.14	69.8 1.7	51.77 0.16	64.0 1.1	4.35 0.22	22.7 2.0
21	31.64 0.08	71.5 1.9	51.93 0.12	65.1 0.8	4.57 0.16	24.7 2.4
31	31.72 0.04	73.4 2.1	52.05 0.09	65.9 0.6	4.73 0.11	27.1 2.6
April 10	31.76 0.01	75.5 2.1	52.14 0.06	66.5 0.4	4.84 0.05	29.7 2.6
20	31.75 0.04	77.6 2.2	52.20 0.03	66.9 0.2	4.89 0.01	32.3 2.7
30	31.71 0.07	79.8 2.0	52.23 0.01	67.1 0.1	4.88 0.05	35.0 2.6
May 10	31.64 0.10	81.8 1.8	52.24 0.02	67.2 0.1	4.83 0.10	37.6 2.4
20	31.54 0.14	83.6 1.7	52.22 0.05	67.1 0.3	4.73 0.14	40.0 2.2
30	31.40 0.15	85.3 1.4	52.17 0.06	66.8 0.3	4.59 0.17	42.2 1.9
June 9	31.25 0.15	86.7 0.9	52.11 0.07	66.5 0.4	4.42 0.19	44.1 1.5
19	31.10 0.16	87.6 0.6	52.04 0.08	66.1 0.5	4.23 0.21	45.6 1.1
29	30.94 0.17	88.2 0.2	51.96 0.10	65.6 0.6	4.02 0.23	46.7 0.6
July 9	30.77 0.16	88.4 0.1	51.86 0.10	65.0 0.6	3.79 0.24	47.3 0.2
19	30.61 0.16	88.3 0.5	51.76 0.11	64.4 0.6	3.55 0.25	47.5 0.2
29	30.45 0.15	87.8 0.9	51.65 0.10	63.8 0.7	3.30 0.24	47.3 0.5
Aug. 8	30.30 0.13	86.9 1.3	51.55 0.09	63.1 0.6	3.06 0.23	46.8 1.2
18	30.17 0.11	85.6 1.6	51.46 0.09	62.5 0.6	2.83 0.22	45.6 1.7
28	30.06 0.08	84.0 2.0	51.37 0.08	61.9 0.5	2.61 0.20	43.9 2.1
Sept. 7	29.98 0.05	82.0 2.2	51.29 0.05	61.4 0.4	2.41 0.15	41.8 2.4
17	29.93 0.02	79.8 2.5	51.24 0.02	61.0 0.2	2.26 0.11	39.4 2.8
27	29.91 0.02	77.3 2.8	51.22 0.02	60.8 0.0	2.15 0.07	36.6 3.0
Oct. 7	29.93 0.09	74.5 2.9	51.24 0.06	60.8 0.2	2.08 0.01	33.6 3.2
17	30.02 0.14	71.6 3.1	51.30 0.12	61.0 0.4	2.07 0.05	30.4 3.6
27	30.16 0.19	68.5 3.2	51.42 0.16	61.4 0.8	2.12 0.12	26.8 3.6
Nov. 6	30.35 0.23	65.3 3.1	51.58 0.21	62.2 1.0	2.24 0.18	23.2 3.5
16	30.58 0.29	62.2 3.1	51.79 0.24	63.2 1.2	2.42 0.25	19.7 3.4
26	30.87 0.33	59.1 2.9	52.03 0.29	64.4 1.5	2.67 0.30	16.3 3.2
Dec. 6	31.20 0.36	56.2 2.6	52.32 0.32	65.9 1.8	2.97 0.36	13.1 3.0
16	31.56 0.39	53.6 2.2	52.64 0.34	67.7 2.0	3.33 0.40	10.1 2.8
26	31.95 0.39	51.4 1.9	52.98 0.34	69.7 2.0	3.73 0.42	7.3 2.2
36	32.34	49.5	53.32	71.7	4.15	5.1

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\gamma$ Bootis.		$\beta$ Centauri.		$\alpha$ Bootis. (Arcturus.)	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.
	<sup>h.</sup> 13 <sup>m.</sup> 48	<sup>°</sup> 19 <sup>'</sup> 5	<sup>h.</sup> 13 <sup>m.</sup> 53	<sup>°</sup> 59 <sup>'</sup> 41	<sup>h.</sup> 14 <sup>m.</sup> 9	<sup>°</sup> 19 <sup>'</sup> 54
Jan. 1	<sup>s.</sup> 1.58 0.34	<sup>"</sup> 48.6 2.2	<sup>s.</sup> 58.35 0.60	<sup>"</sup> 34.3 0.8	<sup>s.</sup> 16.88 0.34	<sup>"</sup> 31.3 2.4
11	1.92 0.34	46.4 1.9	58.95 0.58	35.1 1.3	17.22 0.34	28.9 2.0
21	2.26 0.34	44.5 1.5	59.53 0.55	36.4 1.8	17.56 0.33	26.9 1.6
31	2.60 0.32	43.0 1.1	60.08 0.53	38.2 2.1	17.89 0.31	25.3 1.2
Feb. 10	2.92 0.29	41.9 0.6	60.61 0.50	40.3 2.4	18.20 0.30	24.1 0.8
20	3.21 0.25	41.3 0.2	61.11 0.45	42.7 2.8	18.50 0.26	23.3 0.3
March 1	3.46 0.21	41.1 0.2	61.56 0.38	45.5 2.9	18.76 0.23	23.0 0.2
11	3.67 0.18	41.3 0.5	61.94 0.33	48.4 3.0	18.99 0.20	23.2 0.5
21	3.85 0.15	41.8 0.9	62.27 0.28	51.4 3.0	19.19 0.17	23.7 0.9
31	4.00 0.11	42.7 1.2	62.55 0.22	54.4 3.1	19.36 0.13	24.6 1.2
April 10	4.11 0.08	43.9 1.3	62.77 0.16	57.5 2.9	19.49 0.09	25.8 1.4
20	4.19 0.04	45.2 1.5	62.93 0.09	60.4 2.8	19.58 0.06	27.2 1.5
30	4.23 0.01	46.7 1.6	63.02 0.04	63.2 2.7	19.64 0.03	28.7 1.6
May 10	4.24 0.02	48.3 1.5	63.06 0.03	65.9 2.4	19.67 0.00	30.3 1.6
20	4.22 0.04	49.8 1.5	63.03 0.08	68.3 2.2	19.67 0.02	31.9 1.6
30	4.18 0.06	51.3 1.4	62.95 0.13	70.5 1.8	19.65 0.04	33.5 1.5
June 9	4.12 0.08	52.7 1.2	62.82 0.17	72.3 1.4	19.61 0.08	35.0 1.3
19	4.04 0.10	53.9 1.0	62.65 0.22	73.7 1.1	19.53 0.10	36.3 1.1
29	3.94 0.11	54.9 0.8	62.43 0.26	74.8 0.7	19.43 0.11	37.4 0.9
July 9	3.83 0.12	55.7 0.6	62.17 0.27	75.5 0.2	19.32 0.12	38.3 0.6
19	3.71 0.13	56.3 0.3	61.90 0.29	75.7 0.3	19.20 0.14	38.9 0.4
29	3.58 0.14	56.6 0.0	61.61 0.30	75.4 0.7	19.06 0.14	39.3 0.1
Aug. 8	3.44 0.14	56.6 0.2	61.31 0.29	74.7 1.1	18.92 0.15	39.4 0.2
18	3.30 0.12	56.4 0.5	61.02 0.28	73.6 1.6	18.77 0.14	39.2 0.5
28	3.18 0.10	55.9 0.8	60.74 0.24	72.0 1.8	18.63 0.13	38.7 0.8
Sept. 7	3.08 0.08	55.1 1.0	60.50 0.19	70.2 2.1	18.50 0.10	37.9 1.0
17	3.00 0.05	54.1 1.4	60.31 0.14	68.1 2.3	18.40 0.08	36.9 1.3
27	2.95 0.02	52.7 1.6	60.17 0.05	65.8 2.4	18.32 0.04	35.6 1.6
Oct. 7	2.93 0.03	51.1 1.9	60.12 0.03	63.4 2.4	18.28 0.00	34.0 1.9
17	2.96 0.06	49.2 2.2	60.15 0.12	61.0 2.4	18.28 0.03	32.1 2.3
27	3.02 0.12	47.0 2.4	60.27 0.21	58.6 2.1	18.31 0.09	29.8 2.5
Nov. 6	3.14 0.17	44.6 2.5	60.48 0.29	56.5 1.8	18.40 0.14	27.3 2.6
16	3.31 0.21	42.1 2.6	60.77 0.39	54.7 1.5	18.54 0.20	24.7 2.6
26	3.52 0.25	39.5 2.7	61.16 0.45	53.2 1.1	18.74 0.23	22.1 2.6
Dec. 6	3.77 0.29	36.8 2.6	61.61 0.51	52.1 0.5	18.97 0.26	19.5 2.8
16	4.06 0.32	34.2 2.5	62.12 0.54	51.6 0.1	19.23 0.31	16.7 2.6
26	4.38 0.33	31.7 2.2	62.66 0.58	51.7 0.5	19.54 0.33	14.1 2.4
36	4.71	29.5	63.24	52.2	19.87	11.7

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. after the Mean Noon;



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sideral Day of the Month.	$\alpha^2$ Centauri.		$\epsilon$ Bootis.		$\alpha^2$ LIBRÆ.	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.
	<sup>h.</sup> 14 <sup>m.</sup> 30	<sup>°</sup> 60 <sup>'</sup> 15	<sup>h.</sup> 14 <sup>m.</sup> 38	<sup>°</sup> 27 <sup>'</sup> 39	<sup>h.</sup> 14 <sup>m.</sup> 43	<sup>°</sup> 15 <sup>'</sup> 27
Jan. 1	7.38 0.68	1.5 0.8	52.42 0.34	41.1 2.4	8.38 0.34	32.0 1.6
11	7.96 0.68	1.8 0.8	52.76 0.34	38.7 2.0	8.72 0.34	33.6 1.6
21	8.54 0.68	2.6 1.2	53.10 0.34	36.7 1.6	9.06 0.34	35.2 1.7
31	9.12 0.66	3.8 1.6	53.44 0.34	35.1 1.2	9.40 0.32	36.9 1.6
Feb. 10	9.68 0.64	5.4 1.9	53.78 0.32	33.9 0.6	9.72 0.31	38.5 1.5
20	10.22 0.50	7.3 2.3	54.10 0.29	33.3 0.1	10.03 0.30	40.0 1.4
March 1	10.72 0.45	9.6 2.5	54.39 0.26	33.2 0.4	10.33 0.27	41.4 1.2
11	11.17 0.37	12.1 2.6	54.65 0.24	33.6 0.8	10.60 0.24	42.6 1.1
21	11.54 0.33	14.7 2.8	54.89 0.20	34.4 1.3	10.84 0.21	43.7 0.9
31	11.87 0.28	17.5 2.8	55.09 0.16	35.7 1.6	11.05 0.18	44.6 0.7
April 10	12.15 0.22	20.3 2.8	55.25 0.13	37.3 1.8	11.23 0.15	45.3 0.5
20	12.37 0.17	23.1 2.8	55.38 0.09	39.1 2.1	11.38 0.12	45.8 0.3
30	12.54 0.10	25.9 2.7	55.47 0.05	41.2 2.1	11.50 0.09	46.1 0.2
May 10	12.64 0.03	28.6 2.5	55.52 0.02	43.8 2.1	11.59 0.06	46.3 0.1
20	12.67 0.03	31.1 2.2	55.54 0.01	45.4 2.0	11.65 0.03	46.4 0.0
30	12.64 0.09	33.3 2.0	55.53 0.04	47.4 1.9	11.68 0.00	46.4 0.1
June 9	12.55 0.14	35.3 1.7	55.49 0.07	49.3 1.7	11.68 0.02	46.3 0.2
19	12.41 0.19	37.0 1.4	55.42 0.10	51.0 1.6	11.66 0.05	46.1 0.3
29	12.22 0.22	38.4 1.0	55.32 0.12	52.6 1.3	11.61 0.08	45.8 0.3
July 9	12.00 0.28	39.4 0.6	55.20 0.14	53.9 0.9	11.53 0.10	45.5 0.4
19	11.72 0.31	40.0 0.1	55.06 0.15	54.8 0.5	11.43 0.11	45.1 0.5
29	11.41 0.32	40.1 0.3	54.91 0.16	55.3 0.3	11.32 0.13	44.6 0.5
Aug. 8	11.09 0.33	39.8 0.8	54.75 0.17	55.6 0.1	11.19 0.13	44.1 0.5
18	10.76 0.32	39.0 1.2	54.58 0.17	55.5 0.5	11.06 0.14	43.6 0.6
28	10.44 0.30	37.8 1.6	54.41 0.15	55.0 0.9	10.92 0.13	43.0 0.5
Sept. 7	10.14 0.26	36.2 1.8	54.26 0.14	54.1 1.1	10.79 0.11	42.5 0.5
17	9.88 0.20	34.4 2.1	54.12 0.12	53.0 1.4	10.68 0.09	42.0 0.5
27	9.68 0.14	32.3 2.3	54.00 0.08	51.6 1.9	10.59 0.07	41.5 0.3
Oct. 7	9.54 0.04	30.0 2.4	53.92 0.04	49.7 2.2	10.52 0.03	41.2 0.2
17	9.50 0.04	27.6 2.5	53.88 0.00	47.5 2.4	10.55 0.08	41.0 0.0
27	9.54 0.14	25.1 2.3	53.88 0.04	45.1 2.5	10.63 0.13	41.0 0.2
Nov. 6	9.68 0.22	22.8 2.0	53.92 0.11	42.6 2.8	10.76 0.18	41.2 0.4
16	9.90 0.31	20.8 1.8	54.03 0.17	39.8 3.1	10.94 0.23	41.6 0.7
26	10.21 0.39	19.0 1.4	54.20 0.21	36.7 3.0	11.17 0.26	42.3 1.0
Dec. 6	10.60 0.47	17.6 0.9	54.41 0.26	33.7 2.9	11.43 0.31	43.3 1.2
16	11.07 0.52	16.7 0.6	54.67 0.28	30.8 2.8	11.74 0.32	44.5 1.3
26	11.59 0.56	16.1 0.0	54.95 0.32	28.0 2.5	12.06	45.8 1.5
36	12.15	16.1	55.27	25.5		47.3

after the 22d of March it begins at the Sideral Oh. before the Mean Noon.



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sideral Day of the Month.	$\beta$ URSÆ MINORIS.		$\beta$ LIBRÆ.		$\alpha$ CORONÆ BORRÆALIS	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.
	<sup>h.</sup> <sup>m.</sup> 14 51	<sup>°</sup> <sup>'</sup> 74 42	<sup>h.</sup> <sup>m.</sup> 15 9	<sup>°</sup> <sup>'</sup> 8 51	<sup>h.</sup> <sup>m.</sup> 15 28	<sup>°</sup> <sup>'</sup> 27 10
Jan. 1	<sup>s.</sup> <sup>s.</sup> 7.41 0.78	<sup>"</sup> <sup>"</sup> 73.9 2.3	<sup>s.</sup> <sup>s.</sup> 28.58 0.32	<sup>"</sup> <sup>"</sup> 55.9 1.6	<sup>s.</sup> <sup>s.</sup> 45.41 0.31	<sup>"</sup> <sup>"</sup> 61.1 2.6
11	8.19 0.83	71.6 1.7	28.90 0.33	57.5 1.7	45.72 0.32	58.5 2.3
21	9.02 0.86	69.9 1.1	29.23 0.33	59.2 1.6	46.04 0.34	56.2 1.8
31	9.88 0.88	68.8 0.4	29.56 0.33	60.8 1.5	46.38 0.34	54.4 1.4
Feb. 10	10.76 0.87	68.4 0.3	29.89 0.30	62.3 1.3	46.72 0.33	53.0 0.9
20	11.63 0.82	68.7 0.9	30.19 0.30	63.6 1.1	47.05 0.31	52.1 0.4
March 1	12.45 0.73	69.6 1.5	30.49 0.28	64.7 0.9	47.36 0.28	51.7 0.2
11	13.18 0.63	71.1 2.0	30.77 0.25	65.6 0.7	47.64 0.27	51.9 0.6
21	13.81 0.49	73.1 2.6	31.02 0.22	66.3 0.5	47.91 0.24	52.5 1.0
31	14.30 0.37	75.7 2.9	31.24 0.20	66.8 0.3	48.15 0.21	53.5 1.4
April 10	14.67 0.24	78.6 3.1	31.44 0.17	67.1 0.0	48.36 0.18	54.9 1.8
20	14.91 0.08	81.7 3.2	31.61 0.15	67.1 0.2	48.54 0.14	56.7 2.1
30	14.99 0.07	84.9 3.2	31.76 0.11	66.9 0.3	48.68 0.10	58.8 2.2
May 10	14.92 0.20	88.1 3.0	31.87 0.08	66.6 0.3	48.78 0.07	61.0 2.3
20	14.72 0.32	91.1 2.8	31.95 0.05	66.3 0.4	48.85 0.04	63.3 2.3
30	14.40 0.44	93.9 2.6	32.00 0.02	65.9 0.5	48.89 0.00	65.6 2.2
June 9	13.96 0.54	96.5 2.2	32.02 0.00	65.4 0.5	48.89 0.03	67.8 2.0
19	13.42 0.64	98.7 1.7	32.02 0.04	64.9 0.6	48.86 0.06	69.8 1.9
29	12.78 0.70	100.4 1.2	31.98 0.06	64.3 0.5	48.80 0.09	71.7 1.6
July 9	12.08 0.75	101.6 0.7	31.92 0.07	63.8 0.5	48.71 0.12	73.3 1.3
19	11.33 0.80	102.3 0.2	31.85 0.10	63.3 0.5	48.59 0.15	74.6 0.9
29	10.53 0.81	102.5 0.3	31.75 0.13	62.8 0.5	48.44 0.17	75.5 0.6
Aug. 8	9.72 0.81	102.2 0.9	31.62 0.14	62.3 0.5	48.27 0.18	76.1 0.3
18	8.91 0.79	101.3 1.4	31.48 0.15	61.8 0.4	48.09 0.18	76.4 0.0
28	8.12 0.75	99.9 1.8	31.33 0.14	61.4 0.3	47.91 0.18	76.4 0.4
Sept. 7	7.37 0.70	98.1 2.3	31.19 0.13	61.1 0.2	47.73 0.17	76.0 0.7
17	6.67 0.61	95.8 2.7	31.06 0.11	60.9 0.2	47.56 0.16	75.3 1.2
27	6.06 0.52	93.1 3.0	30.95 0.07	60.7 0.0	47.40 0.13	74.1 1.7
Oct. 7	5.54 0.42	90.1 3.4	30.88 0.04	60.7 0.2	47.27 0.09	72.4 1.9
17	5.12 0.28	86.7 3.6	30.84 0.00	60.9 0.3	47.18 0.05	70.5 2.2
27	4.84 0.14	83.1 3.8	30.84 0.04	61.2 0.5	47.13 0.00	68.3 2.5
Nov. 6	4.70 0.01	79.3 3.8	30.88 0.10	61.7 0.8	47.13 0.05	65.8 2.6
16	4.71 0.17	75.5 3.8	30.98 0.16	62.5 1.0	47.18 0.10	63.2 2.8
26	4.88 0.31	71.7 3.7	31.14 0.20	63.5 1.2	47.28 0.16	60.4 2.9
Dec. 6	5.19 0.46	68.0 3.4	31.34 0.23	64.7 1.3	47.44 0.21	57.5 3.0
16	5.65 0.60	64.6 3.1	31.57 0.28	66.0 1.5	47.65 0.25	54.5 2.8
26	6.25 0.72	61.5 2.5	31.85 0.30	67.5 1.6	47.90 0.28	51.7 2.7
36	6.97	59.0	32.15	69.1	48.18	49.0

NOTE. — Before the 23d of March the Sideral day of the Month begins at the Sideral Oh. after the Mean Noon;



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ SERPENTIS.		$\zeta$ URSAE MINORIS.		$\beta^1$ SCORPII.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.
	<sup>h.</sup> 15 <sup>m.</sup> 37	<sup>°</sup> 6 <sup>'</sup> 51	<sup>h.</sup> 15 <sup>m.</sup> 48	<sup>°</sup> 78 <sup>'</sup> 12	<sup>h.</sup> 15 <sup>m.</sup> 57	<sup>°</sup> 19 <sup>'</sup> 25
Jan. 1	<sup>h.</sup> 22.24 <sup>m.</sup> 0.29	<sup>°</sup> 55.6 <sup>'</sup> 2.1	<sup>h.</sup> 63.96 <sup>m.</sup> 0.78	<sup>°</sup> 62.3 <sup>'</sup> 2.8	<sup>h.</sup> 17.81 <sup>m.</sup> 0.31	<sup>°</sup> 12.7 <sup>'</sup> 1.0
11	22.53 0.31	53.5 1.9	64.74 0.90	59.5 2.8	18.12 0.38	13.7 1.1
21	22.84 0.32	51.6 1.7	65.64 1.00	57.2 1.8	18.45 0.33	14.8 1.1
31	23.16 0.32	49.9 1.4	66.64 1.08	55.4 1.1	18.78 0.34	15.9 1.2
Feb. 10	23.48 0.32	48.5 1.1	67.72 1.11	54.3 0.4	19.12 0.34	17.1 1.1
20	23.80 0.30	47.4 0.9	68.83 1.09	53.9 0.2	19.46 0.33	18.2 1.0
March 1	24.10 0.27	46.5 0.5	69.92 1.03	54.1 0.9	19.79 0.31	19.2 0.9
11	24.37 0.26	46.0 0.0	70.95 0.94	55.0 1.5	20.10 0.29	20.1 0.8
21	24.63 0.24	46.0 0.3	71.89 0.88	56.5 2.0	20.39 0.27	20.9 0.7
31	24.87 0.21	46.3 0.6	72.72 0.67	58.5 2.5	20.66 0.25	21.6 0.6
April 10	25.08 0.18	46.9 0.8	73.39 0.52	61.0 2.8	20.91 0.23	22.2 0.4
20	25.26 0.16	47.7 1.1	73.91 0.34	63.8 3.2	21.14 0.20	22.6 0.3
30	25.42 0.13	48.8 1.2	74.25 0.15	67.0 3.2	21.34 0.17	22.9 0.2
May 10	25.55 0.10	50.0 1.3	74.40 0.04	70.2 3.2	21.51 0.14	23.1 0.1
20	25.65 0.06	51.3 1.5	74.36 0.23	73.4 3.2	21.65 0.10	23.2 0.1
30	25.71 0.04	52.8 1.4	74.13 0.40	76.6 3.0	21.75 0.07	23.3 0.0
June 9	25.75 0.01	54.2 1.3	73.73 0.55	79.6 2.7	21.82 0.04	23.3 0.0
19	25.76 0.03	55.5 1.2	73.18 0.69	82.3 2.4	21.86 0.00	23.3 0.1
29	25.73 0.05	56.7 1.1	72.49 0.83	84.7 2.0	21.86 0.03	23.2 0.1
July 9	25.68 0.08	57.8 1.0	71.66 0.98	86.7 1.5	21.83 0.06	23.1 0.2
19	25.60 0.11	58.8 0.8	70.73 1.03	88.2 0.9	21.77 0.10	22.9 0.3
29	25.49 0.13	59.6 0.6	69.70 1.10	89.1 0.4	21.67 0.12	22.6 0.3
Aug. 8	25.36 0.14	60.2 0.4	68.60 1.13	89.5 0.0	21.55 0.14	22.3 0.3
18	25.22 0.16	60.6 0.3	67.47 1.16	89.5 0.4	21.41 0.16	22.0 0.4
28	25.06 0.15	60.9 0.0	66.31 1.13	89.1 1.0	21.25 0.16	21.6 0.5
Sept. 7	24.91 0.15	60.9 0.2	65.18 1.08	88.1 1.5	21.09 0.16	21.1 0.4
17	24.76 0.13	60.7 0.4	64.10 1.02	86.6 2.1	20.93 0.14	20.7 0.4
27	24.63 0.10	60.3 0.7	63.08 0.93	84.5 2.5	20.79 0.11	20.3 0.4
Oct. 7	24.53 0.07	59.6 0.9	62.15 0.81	82.0 2.8	20.68 0.08	19.9 0.3
17	24.46 0.03	58.7 1.1	61.34 0.65	79.2 3.1	20.60 0.04	19.6 0.3
27	24.43 0.01	57.6 1.4	60.69 0.50	76.1 3.3	20.56 0.00	19.3 0.2
Nov. 6	24.44 0.06	56.2 1.6	60.19 0.32	72.8 3.6	20.56 0.05	19.1 0.0
16	24.50 0.10	54.6 1.9	59.87 0.12	69.2 3.8	20.61 0.12	19.1 0.2
26	24.60 0.16	52.7 2.0	59.75 0.09	65.4 3.7	20.73 0.17	19.3 0.4
Dec. 6	24.76 0.21	50.7 2.1	59.84 0.30	61.7 3.6	20.90 0.21	19.7 0.6
16	24.97 0.25	48.6 2.1	60.14 0.49	58.1 3.4	21.11 0.25	20.3 0.7
26	25.22 0.27	46.5 2.1	60.63 0.67	54.7 3.0	21.36 0.29	21.0 0.9
36	25.49	44.4	61.30	51.7	21.65	21.9

after the 23d of March it begins at the Sidereal Oh. before the Mean Noon.



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\delta$ OPHIUCHI.		$\alpha$ SCORPII. (Antares.)		$\gamma$ Draconis.	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.
	h. m.	$^{\circ}$ $'$	h. m.	$^{\circ}$ $'$	h. m.	$^{\circ}$ $'$
	16 7	3 19	16 20	26 7	16 22	61 49
Jan. 1	0.40 0.28	59.0 1.7	49.33 0.30	7.9 0.6	4.70 0.36	36.7 2.3
11	0.68 0.30	60.7 1.6	49.63 0.33	8.5 0.7	5.06 0.41	33.4 2.8
21	0.98 0.31	62.3 1.5	49.96 0.35	9.2 0.7	5.47 0.46	30.6 2.2
31	1.29 0.32	63.8 1.3	50.31 0.35	9.9 0.8	5.93 0.50	28.4 1.6
Feb. 10	1.61 0.32	65.1 1.1	50.66 0.35	10.7 0.8	6.43 0.52	26.8 1.0
20	1.93 0.30	66.2 0.9	51.01 0.35	11.5 0.9	6.95 0.52	25.8 0.4
March 1	2.23 0.28	67.1 0.6	51.36 0.34	12.4 0.8	7.47 0.51	25.4 0.4
11	2.51 0.28	67.7 0.3	51.70 0.31	13.2 0.8	7.98 0.48	25.8 1.0
21	2.79 0.26	68.0 0.1	52.01 0.30	14.0 0.8	8.46 0.44	26.8 1.5
31	3.05 0.24	68.1 0.1	52.31 0.28	14.8 0.7	8.90 0.37	28.3 2.1
April 10	3.29 0.22	68.0 0.4	52.59 0.26	15.5 0.6	9.27 0.33	30.4 2.5
20	3.51 0.19	67.6 0.7	52.85 0.23	16.1 0.5	9.60 0.26	32.9 3.0
30	3.70 0.16	66.9 0.8	53.08 0.21	16.6 0.5	9.86 0.18	35.9 3.2
May 10	3.86 0.13	66.1 0.8	53.29 0.17	17.1 0.4	10.04 0.11	39.1 3.2
20	3.99 0.10	65.3 0.9	53.46 0.13	17.5 0.4	10.15 0.04	42.3 3.3
30	4.09 0.07	64.4 0.9	53.59 0.10	17.9 0.3	10.19 0.04	45.6 3.2
June 9	4.16 0.03	63.5 0.9	53.69 0.06	18.2 0.3	10.15 0.11	48.8 3.0
19	4.19 0.01	62.6 0.9	53.75 0.03	18.5 0.3	10.04 0.18	51.8 2.9
29	4.20 0.02	61.7 0.8	53.78 0.01	18.8 0.2	9.86 0.25	54.7 2.5
July 9	4.18 0.06	60.9 0.7	53.77 0.06	19.0 0.1	9.61 0.31	57.2 2.0
19	4.12 0.09	60.2 0.7	53.71 0.09	19.1 0.1	9.30 0.35	59.2 1.6
29	4.03 0.11	59.5 0.6	53.62 0.11	19.2 0.0	8.95 0.40	60.8 1.2
Aug. 8	3.92 0.14	58.9 0.5	53.51 0.14	19.2 0.2	8.55 0.44	62.0 0.7
18	3.78 0.15	58.4 0.3	53.37 0.17	19.0 0.3	8.11 0.46	62.7 0.1
28	3.63 0.16	58.1 0.2	53.20 0.18	18.7 0.4	7.65 0.46	62.8 0.4
Sept. 7	3.47 0.15	57.9 0.2	53.02 0.17	18.3 0.4	7.19 0.44	62.4 0.8
17	3.32 0.14	57.7 0.0	52.85 0.16	17.9 0.5	6.75 0.43	61.6 1.3
27	3.18 0.12	57.7 0.2	52.69 0.14	17.4 0.6	6.32 0.40	60.3 1.8
Oct. 7	3.06 0.09	57.9 0.4	52.55 0.10	16.8 0.6	5.92 0.35	58.5 2.4
17	2.97 0.05	58.3 0.6	52.45 0.06	16.2 0.6	5.57 0.29	56.1 2.8
27	2.92 0.01	58.9 0.8	52.39 0.02	15.6 0.5	5.28 0.22	53.3 3.0
Nov. 6	2.91 0.04	59.7 0.9	52.37 0.04	15.1 0.5	5.06 0.15	50.3 3.4
16	2.95 0.08	60.6 1.1	52.41 0.09	14.6 0.3	4.91 0.05	46.9 3.6
26	3.03 0.15	61.7 1.4	52.50 0.16	14.3 0.1	4.86 0.05	43.3 3.7
Dec. 6	3.18 0.19	63.1 1.5	52.66 0.20	14.2 0.0	4.91 0.13	39.6 3.7
16	3.37 0.22	64.6 1.5	52.86 0.24	14.2 0.2	5.04 0.23	35.9 3.6
26	3.59 0.26	66.1 1.6	53.10 0.28	14.4 0.5	5.27 0.31	32.3 3.3
36	3.85	67.7	53.38	14.9	5.58	29.0

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. *q*/ter the Mean Noon;



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ Trianguli Australis.		$\epsilon$ Ursæ Minoris.		$\alpha$ HERCULIS.	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	<sup>h.</sup> 16 <sup>m.</sup> 33	<sup>°</sup> 68 <sup>'</sup> 45	<sup>h.</sup> 17 <sup>m.</sup> 0	<sup>°</sup> 82 <sup>'</sup> 15	<sup>h.</sup> 17 <sup>m.</sup> 8	<sup>°</sup> 14 <sup>'</sup> 32
Jan. 1	<sup>s.</sup> 50.89 0.63	<sup>"</sup> 48.2 1.6	<sup>s.</sup> 16.99 0.68	<sup>"</sup> 25.3 3.2	<sup>s.</sup> 15.32 0.22	<sup>"</sup> 59.2 2.3
11	51.52 0.69	46.6 1.2	17.67 0.92	22.1 2.9	15.54 0.25	56.9 2.1
21	52.21 0.74	45.4 0.9	18.59 1.17	19.2 2.4	15.79 0.27	54.8 1.8
31	52.95 0.77	44.5 0.4	19.76 1.37	16.8 1.9	16.06 0.29	53.0 1.7
Feb. 10	53.72 0.78	44.1 0.1	21.13 1.53	14.9 1.3	16.35 0.30	51.3 1.3
20	54.50 0.80	44.2 0.5	22.66 1.60	13.6 0.7	16.65 0.31	50.0 0.8
March 1	55.30 0.79	44.7 0.9	24.26 1.61	12.9 0.0	16.96 0.30	49.2 0.4
11	56.09 0.74	45.6 1.2	25.87 1.56	12.9 0.6	17.26 0.29	48.8 0.1
21	56.83 0.70	46.8 1.4	27.43 1.46	13.5 1.3	17.55 0.29	48.9 0.4
31	57.53 0.66	48.2 1.7	28.89 1.32	14.8 1.9	17.84 0.28	49.3 0.9
April 10	58.19 0.60	49.9 2.1	30.21 1.13	16.7 2.3	18.12 0.25	50.2 1.2
20	58.79 0.54	52.0 2.3	31.34 0.88	19.0 2.7	18.37 0.23	51.4 1.5
30	59.33 0.44	54.3 2.4	32.22 0.63	21.7 3.0	18.60 0.21	52.9 1.8
May 10	59.77 0.37	56.7 2.5	32.85 0.36	24.7 3.1	18.81 0.17	54.7 1.9
20	60.14 0.28	59.2 2.6	33.21 0.08	27.8 3.3	18.98 0.14	56.6 2.0
30	60.42 0.18	61.8 2.6	33.29 0.20	31.1 3.3	19.12 0.12	58.6 2.0
June 9	60.60 0.09	64.4 2.5	33.09 0.48	34.4 3.1	19.24 0.08	60.6 2.0
19	60.69 0.01	66.9 2.4	32.61 0.73	37.5 3.0	19.32 0.03	62.6 2.0
29	60.68 0.11	69.3 2.1	31.88 0.99	40.5 2.7	19.35 0.00	64.6 1.9
July 9	60.57 0.20	71.4 2.0	30.89 1.20	43.2 2.3	19.35 0.04	66.5 1.6
19	60.37 0.30	73.4 1.5	29.69 1.39	45.5 2.0	19.31 0.07	68.1 1.4
29	60.07 0.36	74.9 1.2	28.30 1.57	47.5 1.5	19.24 0.11	69.5 1.2
Aug. 8	59.71 0.43	76.1 0.8	26.73 1.70	49.0 1.1	19.13 0.14	70.7 0.9
18	59.28 0.47	76.9 0.3	25.03 1.78	50.1 0.6	18.99 0.16	71.6 0.6
28	58.81 0.49	77.2 0.2	23.25 1.83	50.7 0.1	18.83 0.18	72.2 0.4
Sept. 7	58.32 0.49	77.0 0.7	21.42 1.84	50.8 0.4	18.65 0.18	72.6 0.1
17	57.83 0.47	76.3 1.1	19.58 1.81	50.4 1.0	18.47 0.18	72.7 0.2
27	57.36 0.41	75.2 1.5	17.77 1.74	49.4 1.4	18.29 0.17	72.5 0.5
Oct. 7	56.95 0.34	73.7 1.9	16.03 1.61	48.0 1.8	18.12 0.14	72.0 0.8
17	56.61 0.25	71.8 2.3	14.42 1.47	46.2 2.4	17.98 0.11	71.2 1.2
27	56.36 0.14	69.5 2.5	12.95 1.26	43.8 2.3	17.87 0.07	70.0 1.4
Nov. 6	56.22 0.01	67.0 2.6	11.69 1.03	41.0 3.0	17.80 0.03	68.6 1.7
16	56.21 0.10	64.4 2.6	10.66 0.75	38.0 3.2	17.77 0.01	66.9 1.9
26	56.31 0.24	61.8 2.5	9.91 0.46	34.8 3.5	17.78 0.05	65.0 2.1
Dec. 6	56.55 0.37	59.3 2.3	9.45 0.14	31.3 3.5	17.83 0.11	62.9 2.2
16	56.92 0.46	57.0 2.2	9.31 0.20	27.8 3.5	17.94 0.16	60.7 2.3
26	57.38 0.56	54.8 1.8	9.51 0.49	24.3 3.3	18.10 0.20	58.4 2.3
36	57.94	53.0	10.00	21.0	18.30	56.1

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\beta$ DRACONIS.		$\alpha$ OPHIUCHI		$\sigma$ OCTANTIS.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.
	<sup>h.</sup> 17 <sup>m.</sup> 27	<sup>°</sup> 52 <sup>'</sup> 23	<sup>h.</sup> 17 <sup>m.</sup> 28	<sup>°</sup> 12 <sup>'</sup> 39	<sup>h.</sup> 17	<sup>°</sup> 89 <sup>'</sup> 16
Jan. 1	<sup>s.</sup> 14.56 0.21	<sup>"</sup> 70.6 3.5	<sup>s.</sup> 25.61 0.21	<sup>"</sup> 44.4 2.2	<sup>m.</sup> 46 49.96 10.42	<sup>"</sup> 41.6 3.0
11	14.77 0.27	67.1 3.1	25.82 0.23	42.2 2.0	47 0.38 13.23	38.6 2.8
21	15.04 0.32	64.0 2.7	26.05 0.26	40.2 1.9	47 13.61 15.67	35.8 2.4
31	15.36 0.36	61.3 2.3	26.31 0.28	38.3 1.5	47 29.28 17.68	33.4 1.8
Feb. 10	15.72 0.39	59.0 1.6	26.59 0.29	36.8 1.2	47 46.96 19.20	31.6 1.5
20	16.11 0.41	57.4 1.2	26.88 0.30	35.6 0.9	48 6.16 20.23	30.1 1.0
March 1	16.52 0.42	56.2 0.5	27.18 0.30	34.7 0.5	48 26.39 20.80	29.1 0.5
11	16.94 0.41	55.7 0.2	27.48 0.30	34.2 0.0	48 47.19 20.94	28.6 0.0
21	17.35 0.40	55.9 0.9	27.78 0.29	34.2 0.4	49 8.13 20.62	28.6 0.4
31	17.75 0.37	56.8 1.5	28.07 0.27	34.6 0.8	49 28.75 19.84	29.0 0.9
April 10	18.12 0.34	58.3 2.0	28.34 0.26	35.4 1.1	49 48.59 18.69	29.9 1.4
20	18.46 0.30	60.3 2.4	28.60 0.25	36.5 1.4	50 7.28 17.16	31.3 1.8
30	18.76 0.26	62.7 2.8	28.85 0.22	37.9 1.7	50 24.44 15.28	33.1 2.2
May 10	19.02 0.21	65.5 3.0	29.07 0.20	39.6 1.9	50 39.72 13.07	35.3 2.4
20	19.23 0.16	68.5 3.3	29.27 0.16	41.5 2.0	50 52.79 10.61	37.7 2.7
30	19.39 0.10	71.8 3.3	29.43 0.13	43.5 2.0	51 3.40 7.92	40.4 2.9
June 9	19.49 0.04	75.1 3.3	29.56 0.10	45.5 2.0	51 11.32 5.06	43.3 3.0
19	19.53 0.03	78.4 3.3	29.66 0.06	47.5 1.9	51 16.38 2.06	46.3 3.0
29	19.50 0.08	81.7 3.0	29.72 0.02	49.4 1.8	51 18.46 0.98	49.3 3.0
July 9	19.42 0.14	84.7 2.7	29.74 0.02	51.2 1.7	51 17.53 3.89	52.3 2.9
19	19.28 0.20	87.4 2.3	29.72 0.06	52.9 1.4	51 13.64 6.74	55.2 2.7
29	19.06 0.25	89.7 2.0	29.66 0.10	54.3 1.2	51 6.90 9.38	57.9 2.3
Aug. 8	18.83 0.28	91.7 1.6	29.56 0.12	55.5 1.0	50 57.52 11.68	60.2 1.9
18	18.55 0.30	93.3 1.1	29.44 0.15	56.5 0.7	50 45.84 13.58	62.1 1.5
28	18.25 0.34	94.4 0.6	29.29 0.17	57.2 0.4	50 32.26 15.02	63.6 0.9
Sept. 7	17.91 0.35	95.0 0.1	29.12 0.18	57.6 0.2	50 17.24 15.90	64.5 0.4
17	17.56 0.35	95.1 0.4	28.94 0.18	57.8 0.0	50 1.34 16.17	64.9 0.2
27	17.21 0.34	94.7 0.9	28.76 0.18	57.8 0.3	49 45.17 15.77	64.7 0.8
Oct. 7	16.87 0.31	93.8 1.4	28.58 0.15	57.5 0.7	49 29.40 14.75	63.9 1.3
17	16.56 0.28	92.4 1.8	28.43 0.12	56.8 1.1	49 14.65 13.13	62.6 2.1
27	16.28 0.23	90.6 2.3	28.31 0.08	55.7 1.2	49 1.52 10.93	60.5 2.6
Nov. 6	16.05 0.17	88.3 2.7	28.23 0.05	54.5 1.5	48 50.59 8.23	57.9 2.8
16	15.88 0.10	85.6 3.0	28.18 0.00	53.0 1.7	48 42.36 5.17	55.1 3.0
26	15.78 0.05	82.6 3.4	28.18 0.05	51.3 1.9	48 37.19 1.87	52.1 3.2
Dec 6	15.73 0.02	79.2 3.5	28.23 0.08	49.4 2.1	48 35.32 1.57	48.9 3.4
16	15.75 0.11	75.7 3.5	28.31 0.14	47.3 2.2	48 36.89 5.01	45.5 3.4
26	15.86 0.18	72.2 3.4	28.45 0.18	45.1 2.2	48 41.90 8.28	42.1 3.2
36	16.04	68.8	28.63	42.9	48 50.18	38.9

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\gamma$ DRACONIS.		$\mu^1$ Sagittarii.		$\alpha$ LYRÆ. (Vega.)	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.
	<sup>h.</sup> <sup>m.</sup> 17 53	<sup>h.</sup> <sup>m.</sup> 51 29	<sup>h.</sup> <sup>m.</sup> 18 5	<sup>h.</sup> <sup>m.</sup> 21 5	<sup>h.</sup> <sup>m.</sup> 18 32	<sup>h.</sup> <sup>m.</sup> 38 38
Jan. 1	19.62 0.17	73.8 3.5	22.86 0.20	35.8 0.1	10.66 0.12	72.5 3.1
11	19.79 0.23	70.3 3.2	23.06 0.24	35.9 0.2	10.78 0.17	69.4 3.0
21	20.02 0.28	67.1 2.9	23.30 0.27	36.1 0.2	10.95 0.21	66.4 2.8
31	20.30 0.33	64.2 2.5	23.57 0.29	36.3 0.2	11.16 0.25	63.6 2.4
Feb. 10	20.63 0.36	61.7 1.9	23.86 0.31	36.5 0.2	11.41 0.29	61.2 2.0
20	20.99 0.39	59.8 1.3	24.17 0.31	36.7 0.1	11.70 0.32	59.2 1.5
March 1	21.38 0.40	58.5 0.8	24.48 0.32	36.8 0.0	12.02 0.33	57.7 0.9
11	21.78 0.41	57.7 0.1	24.80 0.33	36.8 0.1	12.35 0.34	56.8 0.4
21	22.19 0.41	57.6 0.7	25.13 0.31	36.7 0.2	12.69 0.34	56.4 0.2
31	22.60 0.39	58.3 1.2	25.44 0.32	36.5 0.2	13.03 0.34	56.6 0.8
April 10	22.99 0.35	59.5 1.7	25.76 0.32	36.3 0.3	13.37 0.32	57.4 1.3
20	23.34 0.33	61.2 2.3	26.08 0.30	36.0 0.4	13.69 0.32	58.7 1.8
30	23.67 0.29	63.5 2.8	26.38 0.28	35.6 0.3	14.01 0.29	60.5 2.3
May 10	23.96 0.24	66.3 3.0	26.66 0.26	35.3 0.4	14.30 0.26	62.8 2.7
20	24.20 0.20	69.3 3.1	26.92 0.22	34.9 0.4	14.56 0.22	65.5 3.1
30	24.40 0.14	72.4 3.3	27.14 0.19	34.5 0.3	14.78 0.19	68.6 3.1
June 9	24.54 0.08	75.7 3.4	27.33 0.16	34.2 0.3	14.97 0.14	71.7 3.1
19	24.62 0.01	79.1 3.3	27.49 0.13	33.9 0.2	15.11 0.10	74.8 3.1
29	24.63 0.05	82.4 3.2	27.62 0.08	33.7 0.1	15.21 0.04	77.9 3.0
July 9	24.58 0.10	85.6 2.9	27.70 0.04	33.6 0.1	15.25 0.01	80.9 2.9
19	24.48 0.15	88.5 2.5	27.74 0.01	33.5 0.0	15.24 0.06	83.8 2.8
29	24.33 0.20	91.0 2.2	27.73 0.05	33.5 0.0	15.18 0.10	86.6 2.5
Aug. 8	24.13 0.26	93.2 1.9	27.68 0.09	33.5 0.0	15.08 0.15	89.1 2.1
18	23.87 0.29	95.1 1.5	27.59 0.13	33.5 0.0	14.93 0.19	91.2 1.6
28	23.58 0.33	96.6 1.0	27.46 0.16	33.5 0.0	14.74 0.21	92.8 1.2
Sept. 7	23.25 0.35	97.6 0.5	27.30 0.17	33.5 0.0	14.53 0.25	94.0 0.9
17	22.90 0.34	98.1 0.1	27.13 0.17	33.5 0.0	14.28 0.25	94.9 0.5
27	22.56 0.34	98.0 0.5	26.96 0.17	33.5 0.1	14.03 0.25	95.4 0.0
Oct. 7	22.22 0.32	97.5 1.1	26.79 0.16	33.4 0.1	13.78 0.24	95.4 0.5
17	21.90 0.29	96.4 1.5	26.63 0.14	33.3 0.2	13.54 0.23	94.9 1.0
27	21.61 0.25	94.9 2.0	26.49 0.10	33.1 0.1	13.31 0.20	93.9 1.4
Nov. 6	21.36 0.20	92.9 2.4	26.39 0.06	33.0 0.2	13.11 0.18	92.5 1.9
16	21.16 0.14	90.5 2.9	26.33 0.01	32.8 0.1	12.93 0.12	90.6 2.2
26	21.02 0.07	87.6 3.3	26.32 0.04	32.7 0.0	12.81 0.06	88.4 2.6
Dec. 6	20.95 0.00	84.3 3.3	26.36 0.08	32.7 0.0	12.75 0.00	85.8 2.8
16	20.95 0.06	81.0 3.3	26.44 0.13	32.7 0.0	12.75 0.04	83.0 3.0
26	21.01 0.14	77.7 3.4	26.57 0.18	32.7 0.1	12.79 0.08	80.0 3.0
36	21.15	74.3	26.75	32.8	12.87	77.0

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\beta$ LYRÆ.		$\zeta$ AQUILÆ.		$\delta$ AQUILÆ.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	<sup>h.</sup> 18 <sup>m.</sup> 44	<sup>°</sup> 33 <sup>'</sup> 11	<sup>h.</sup> 18 <sup>m.</sup> 58	<sup>°</sup> 13 <sup>'</sup> 39	<sup>h.</sup> 19 <sup>m.</sup> 18	<sup>°</sup> 2 <sup>'</sup> 50
Jan. 1	<sup>s.</sup> 53.53 0.11	<sup>s.</sup> 62.5 2.9	<sup>s.</sup> 57.73 0.11	<sup>s.</sup> 24.8 2.1	<sup>s.</sup> 25.73 0.10	<sup>s.</sup> 14.3 1.4
11	53.64 0.16	59.6 2.8	57.84 0.15	22.7 1.9	25.83 0.14	12.9 1.3
21	53.80 0.20	56.8 2.7	57.99 0.19	20.8 1.7	25.97 0.18	11.6 1.1
31	54.00 0.23	54.1 2.3	58.18 0.22	19.1 1.6	26.15 0.20	10.5 1.0
Feb. 10	54.23 0.26	51.8 1.9	58.40 0.24	17.5 1.2	26.35 0.23	9.5 0.8
20	54.49 0.29	49.9 1.4	58.64 0.25	16.3 1.1	26.58 0.25	8.7 0.6
March 1	54.78 0.31	48.5 0.9	58.89 0.27	15.2 0.7	26.83 0.27	8.1 0.3
11	55.09 0.32	47.6 0.4	59.16 0.29	14.5 0.1	27.10 0.28	7.8 0.0
21	55.41 0.32	47.2 0.0	59.45 0.30	14.4 0.3	27.38 0.29	7.8 0.4
31	55.73 0.33	47.2 0.6	59.75 0.31	14.7 0.7	27.67 0.30	8.2 0.7
April 10	56.06 0.33	47.8 1.3	60.06 0.30	15.4 1.0	27.97 0.30	8.9 1.0
20	56.39 0.30	49.1 1.8	60.36 0.28	16.4 1.4	28.27 0.29	9.9 1.3
30	56.69 0.28	50.9 2.2	60.64 0.28	17.8 1.7	28.56 0.29	11.2 1.5
May 10	56.97 0.26	53.1 2.5	60.92 0.26	19.5 1.9	28.85 0.27	12.7 1.6
20	57.23 0.24	55.6 2.7	61.18 0.24	21.4 2.2	29.12 0.26	14.3 1.8
30	57.47 0.20	58.3 2.9	61.42 0.22	23.6 2.3	29.38 0.23	16.1 1.9
June 9	57.67 0.16	61.2 3.0	61.64 0.18	25.9 2.3	29.61 0.21	18.0 1.8
19	57.83 0.11	64.2 3.0	61.82 0.14	28.2 2.2	29.82 0.17	19.8 1.7
29	57.94 0.07	67.2 3.0	61.96 0.10	30.4 2.2	29.99 0.13	21.5 1.7
July 9	58.01 0.01	70.2 2.8	62.06 0.06	32.6 2.1	30.12 0.09	23.2 1.6
19	58.02 0.03	73.0 2.5	62.12 0.01	34.7 1.9	30.21 0.04	24.8 1.4
29	57.99 0.07	75.5 2.3	62.13 0.03	36.6 1.7	30.25 0.00	26.2 1.3
Aug. 8	57.92 0.12	77.8 2.1	62.10 0.07	38.3 1.5	30.25 0.05	27.5 1.1
18	57.80 0.16	79.9 1.8	62.03 0.11	39.8 1.2	30.20 0.08	28.6 0.8
28	57.64 0.19	81.7 1.4	61.92 0.13	41.0 1.0	30.12 0.11	29.4 0.6
Sept. 7	57.45 0.22	83.1 0.9	61.79 0.16	42.0 0.6	30.01 0.14	30.0 0.5
17	57.23 0.22	84.0 0.4	61.63 0.18	42.6 0.3	29.87 0.17	30.5 0.3
27	57.01 0.23	84.4 0.0	61.45 0.18	42.9 0.0	29.70 0.17	30.8 0.0
Oct. 7	56.78 0.22	84.4 0.4	61.27 0.18	42.9 0.2	29.53 0.17	30.8 0.1
17	56.56 0.21	84.0 0.7	61.09 0.16	42.7 0.4	29.36 0.15	30.7 0.3
27	56.35 0.18	83.3 1.2	60.93 0.14	42.3 0.8	29.21 0.13	30.4 0.5
Nov. 6	56.17 0.16	82.1 1.5	60.79 0.11	41.5 1.1	29.08 0.11	29.9 0.7
16	56.01 0.11	80.6 2.1	60.68 0.08	40.4 1.3	28.97 0.07	29.2 0.9
26	55.90 0.06	78.5 2.4	60.60 0.04	39.1 1.6	28.90 0.03	28.3 1.1
Dec. 6	55.84 0.01	76.1 2.6	60.56 0.01	37.5 1.7	28.87 0.00	27.2 1.1
16	55.83 0.03	73.5 2.7	60.57 0.05	35.8 1.9	28.87 0.04	26.1 1.3
26	55.86 0.09	70.8 2.9	60.62 0.09	33.9 2.0	28.91 0.08	24.9 1.4
36	55.95	67.9	60.71	31.9	28.99	23.5

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\gamma$ AQUILÆ.		$\alpha$ AQUILÆ. (Altair.)		$\beta$ AQUILÆ.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	h. m. 19 39 s. s.	° ' " 10 16 " "	h. m. 19 43 s. s.	° ' " 8 29 " "	h. m. 19 48 s. s.	° ' " 6 3 " "
Jan. 1	35.56 0.07	25.3 1.7	56.52 0.07	60.8 1.6	25.56 0.07	30.8 1.4
11	35.63 0.12	23.6 1.6	56.59 0.11	59.2 1.5	25.63 0.11	29.4 1.4
21	35.75 0.15	22.0 1.6	56.70 0.15	57.7 1.5	25.74 0.15	28.0 1.4
31	35.90 0.18	20.4 1.4	56.85 0.18	56.2 1.3	25.89 0.18	26.6 1.2
Feb. 10	36.08 0.21	19.0 1.0	57.03 0.20	54.9 1.0	26.07 0.20	25.4 0.9
20	36.29 0.23	18.0 0.9	57.23 0.23	53.9 0.8	26.27 0.22	24.5 0.7
March 1	36.52 0.25	17.1 0.5	57.46 0.25	53.1 0.4	26.49 0.25	23.8 0.4
11	36.77 0.27	16.6 0.2	57.71 0.27	52.7 0.1	26.74 0.27	23.4 0.0
21	37.04 0.29	16.4 0.2	57.98 0.29	52.6 0.3	27.01 0.28	23.4 0.3
31	37.33 0.30	16.6 0.6	58.27 0.30	52.9 0.7	27.29 0.29	23.7 0.6
April 10	37.63 0.30	17.2 1.0	58.57 0.30	53.6 1.0	27.58 0.31	24.3 1.0
20	37.93 0.30	18.2 1.4	58.87 0.31	54.6 1.3	27.89 0.31	25.3 1.3
30	38.23 0.30	19.6 1.6	59.18 0.30	55.9 1.6	28.20 0.30	26.6 1.6
May 10	38.53 0.29	21.2 1.8	59.48 0.28	57.5 1.8	28.50 0.27	28.2 1.8
20	38.82 0.26	23.0 2.1	59.76 0.26	59.3 2.0	28.77 0.27	30.0 1.9
30	39.08 0.24	25.1 2.2	60.02 0.25	61.3 2.1	29.04 0.25	31.9 2.0
June 9	39.32 0.22	27.3 2.2	60.27 0.22	63.4 2.1	29.29 0.22	33.9 2.0
19	39.54 0.18	29.5 2.2	60.49 0.19	65.5 2.2	29.51 0.19	35.9 2.0
29	39.72 0.14	31.7 2.1	60.68 0.14	67.7 2.1	29.70 0.16	37.9 1.9
July 9	39.86 0.10	33.8 2.0	60.82 0.10	69.8 2.0	29.86 0.12	39.8 1.8
19	39.96 0.05	35.8 1.9	60.92 0.07	71.8 1.8	29.98 0.06	41.6 1.7
29	40.01 0.01	37.7 1.7	60.99 0.02	73.6 1.6	30.04 0.02	43.3 1.5
Aug. 8	40.02 0.03	39.4 1.5	61.01 0.03	75.2 1.4	30.06 0.02	44.8 1.3
18	39.99 0.07	40.9 1.3	60.98 0.06	76.6 1.2	30.04 0.06	46.1 1.1
28	39.92 0.11	42.2 1.0	60.92 0.10	77.8 0.9	29.98 0.10	47.2 0.9
Sept. 7	39.81 0.13	43.2 0.7	60.82 0.13	78.7 0.7	29.88 0.13	48.1 0.6
17	39.68 0.16	43.9 0.5	60.69 0.16	79.4 0.5	29.75 0.15	48.7 0.4
27	39.52 0.17	44.4 0.2	60.53 0.16	79.9 0.2	29.60 0.16	49.1 0.2
Oct. 7	39.35 0.17	44.6 0.0	60.37 0.17	80.1 0.0	29.44 0.17	49.3 0.1
17	39.18 0.17	44.6 0.3	60.20 0.16	80.1 0.2	29.27 0.16	49.2 0.3
27	39.01 0.15	44.3 0.5	60.04 0.15	79.9 0.4	29.11 0.15	48.9 0.5
Nov. 6	38.86 0.12	43.8 0.8	59.89 0.13	79.5 0.8	28.96 0.12	48.4 0.7
16	38.74 0.10	43.0 1.1	59.76 0.09	78.7 1.0	28.84 0.09	47.7 1.0
26	38.64 0.06	41.9 1.2	59.67 0.05	77.7 1.1	28.75 0.06	46.7 1.1
Dec. 6	38.58 0.02	40.7 1.4	59.62 0.02	76.6 1.3	28.69 0.02	45.6 1.1
16	38.56 0.02	39.3 1.6	59.60 0.01	75.3 1.5	28.67 0.01	44.5 1.3
26	38.58 0.05	37.7 1.7	59.61 0.05	73.8 1.6	28.68 0.05	43.2 1.5
36	38.63	36.0	59.66	72.2	28.73	41.7

after the 23d of March it begins at the Sidereal Oh. before the Mean Noon



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\lambda$ Ursæ Minoris.			$\alpha^2$ CAPRICORN.			$\alpha$ Pavonis.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.	Right Ascension.		Dec. South.
	h. 20		88 53	h. m. 20 10		12 58	h. m. 20 14		57 10
	m. s.	s.		s.	s.		s.	s.	
Jan. 1	2 23.22	4.75	29.3 2.9	16.64 0.06	39.7 0.2	32.48 0.07	54.2 2.4		
11	2 18.47	2.55	26.4 3.1	16.70 0.10	39.9 0.2	32.55 0.14	51.8 2.4		
21	2 15.92	0.30	23.3 3.2	16.80 0.14	40.1 0.2	32.69 0.20	49.4 2.5		
31	2 15.62	1.95	20.1 3.2	16.94 0.16	40.3 0.0	32.89 0.26	46.9 2.5		
Feb. 10	2 17.57	4.10	16.9 2.9	17.10 0.19	40.3 0.1	33.15 0.32	44.4 2.4		
20	2 21.67	6.03	14.0 2.6	17.29 0.22	40.2 0.3	33.47 0.37	42.0 2.4		
March 1	2 27.70	7.71	11.4 2.2	17.51 0.25	39.9 0.5	33.84 0.41	39.6 2.2		
11	2 35.41	9.05	9.2 1.6	17.76 0.27	39.4 0.6	34.25 0.45	37.4 1.9		
21	2 44.46	10.02	7.6 1.2	18.03 0.29	38.8 0.8	34.70 0.47	35.5 1.7		
31	2 54.48	10.58	6.4 0.6	18.32 0.30	38.0 1.0	35.17 0.50	33.8 1.5		
April 10	3 5.06	10.73	5.8 0.0	18.62 0.31	37.0 1.2	35.67 0.52	32.3 1.2		
20	3 15.79	10.49	5.8 0.7	18.93 0.32	35.8 1.3	36.19 0.53	31.1 1.0		
30	3 26.28	9.85	6.5 1.3	19.25 0.32	34.5 1.4	36.72 0.53	30.1 0.6		
May 10	3 36.13	8.90	7.8 1.8	19.57 0.30	33.1 1.4	37.25 0.51	29.5 0.2		
20	3 45.03	7.68	9.6 2.2	19.87 0.30	31.7 1.3	37.76 0.50	29.3 0.1		
30	3 52.71	6.22	11.8 2.6	20.17 0.28	30.4 1.3	38.26 0.46	29.4 0.4		
June 9	3 58.93	4.58	14.4 3.0	20.45 0.26	29.1 1.2	38.72 0.41	29.8 0.8		
19	4 3.51	2.81	17.4 3.3	20.71 0.22	27.9 1.2	39.13 0.36	30.6 1.1		
29	4 6.32	0.98	20.7 3.4	20.93 0.19	26.7 1.0	39.49 0.30	31.7 1.4		
July 9	4 7.30	0.87	24.1 3.5	21.12 0.15	25.7 0.8	39.79 0.23	33.1 1.6		
19	4 6.43	2.70	27.6 3.4	21.27 0.10	24.9 0.7	40.02 0.15	34.7 1.8		
29	4 3.73	4.48	31.0 3.4	21.37 0.06	24.2 0.5	40.17 0.07	36.5 1.9		
Aug. 8	3 59.25	6.16	34.4 3.2	21.43 0.00	23.7 0.3	40.24 0.01	38.4 1.9		
18	3 53.09	7.72	37.6 3.1	21.43 0.04	23.4 0.2	40.23 0.08	40.3 2.0		
28	3 45.37	9.11	40.7 2.8	21.39 0.08	23.2 0.1	40.15 0.15	42.3 1.8		
Sept. 7	3 36.26	10.31	43.5 2.4	21.31 0.11	23.1 0.0	40.00 0.22	44.1 1.6		
17	3 25.95	11.33	45.9 2.1	21.20 0.13	23.1 0.2	39.78 0.26	45.7 1.3		
27	3 14.62	12.12	48.0 1.6	21.07 0.15	23.3 0.2	39.52 0.30	47.0 1.0		
Oct. 7	3 2.50	12.66	49.6 1.1	20.92 0.16	23.5 0.3	39.22 0.32	48.0 0.6		
17	2 49.84	12.93	50.7 0.7	20.76 0.16	23.8 0.3	38.90 0.32	48.6 0.2		
27	2 36.91	12.87	51.4 0.1	20.60 0.15	24.1 0.3	38.58 0.30	48.8 0.2		
Nov. 6	2 24.04	12.50	51.5 0.5	20.45 0.12	24.4 0.3	38.28 0.27	48.6 0.7		
16	2 11.54	11.80	51.0 0.9	20.33 0.09	24.7 0.3	38.01 0.24	47.9 1.1		
26	1 59.74	10.80	50.1 1.5	20.24 0.06	25.0 0.3	37.77 0.18	46.8 1.5		
Dec. 6	1 48.94	9.47	48.6 2.0	20.18 0.03	25.3 0.3	37.59 0.12	45.3 1.7		
16	1 39.47	7.84	46.6 2.5	20.15 0.00	25.6 0.3	37.47 0.04	43.6 2.0		
26	1 31.63	5.91	44.1 2.8	20.15 0.04	25.9 0.3	37.43 0.02	41.6 2.2		
36	1 25.72		41.3	20.19	26.2	37.45	39.4		

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. after the Mean Noon;



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ CYGNI.		61 <sup>1</sup> CYGNI.		$\zeta$ Cygni.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	<sup>h.</sup> 20 <sup>m.</sup> 36	<sup>°</sup> 44 <sup>'</sup> 46	<sup>h.</sup> 21 <sup>m.</sup> 0	<sup>°</sup> 38 <sup>'</sup> 3	<sup>h.</sup> 21 <sup>m.</sup> 6	<sup>°</sup> 29 <sup>'</sup> 39
Jan. 1	<sup>h.</sup> 38.18 <sup>m.</sup> 0.04	<sup>°</sup> 58.2 <sup>'</sup> 2.7	<sup>h.</sup> 36.21 <sup>m.</sup> 0.08	<sup>°</sup> 52.2 <sup>'</sup> 2.4	<sup>h.</sup> 57.93 <sup>m.</sup> 0.04	<sup>°</sup> 20.6 <sup>'</sup> 2.1
11	38.14 0.01	55.5 2.8	36.18 0.00	49.8 2.5	57.89 0.01	18.5 2.3
21	38.15 0.06	52.7 3.0	36.18 0.05	47.3 2.6	57.90 0.05	16.2 2.4
31	38.21 0.12	49.7 2.9	36.23 0.10	44.7 2.5	57.95 0.09	13.8 2.3
Feb. 10	38.33 0.16	46.8 2.6	36.33 0.14	42.2 2.3	58.04 0.12	11.5 2.1
20	38.49 0.21	44.2 2.3	36.47 0.18	39.9 2.0	58.16 0.16	9.4 1.8
March 1	38.70 0.25	41.9 1.9	36.65 0.22	37.9 1.6	58.32 0.19	7.6 1.5
11	38.95 0.29	40.0 1.3	36.87 0.26	36.3 1.2	58.51 0.23	6.1 0.9
21	39.24 0.33	38.7 0.9	37.13 0.30	35.1 0.8	58.74 0.26	5.2 0.6
31	39.57 0.35	37.8 0.3	37.43 0.33	34.3 0.3	59.00 0.29	4.6 0.1
April 10	39.92 0.37	37.5 0.3	37.76 0.34	34.0 0.3	59.29 0.31	4.5 0.4
20	40.29 0.38	37.8 0.8	38.10 0.36	34.3 1.0	59.60 0.33	4.9 0.8
30	40.67 0.38	38.6 1.4	38.46 0.36	35.3 1.5	59.93 0.34	5.7 1.3
May 10	41.05 0.37	40.0 1.9	38.82 0.36	36.8 1.8	60.27 0.33	7.0 1.8
20	41.42 0.35	41.9 2.5	39.18 0.36	38.6 2.2	60.60 0.33	8.8 2.3
30	41.77 0.31	44.4 2.8	39.54 0.34	40.8 2.6	60.93 0.31	11.1 2.5
June 9	42.08 0.29	47.2 3.0	39.88 0.29	43.4 2.9	61.24 0.28	13.6 2.7
19	42.37 0.25	50.2 3.3	40.17 0.27	46.3 3.2	61.52 0.25	16.3 2.8
29	42.62 0.20	53.5 3.4	40.44 0.23	49.5 3.3	61.77 0.22	19.1 2.9
July 9	42.82 0.14	56.9 3.4	40.67 0.19	52.8 3.4	61.99 0.18	22.0 3.0
19	42.96 0.08	60.3 3.4	40.86 0.13	56.2 3.4	62.17 0.13	25.0 3.0
29	43.04 0.02	63.7 3.3	40.99 0.06	59.6 3.3	62.30 0.08	28.0 2.9
Aug. 8	43.06 0.04	67.0 3.1	41.05 0.02	62.9 3.1	62.38 0.04	30.9 2.7
18	43.02 0.08	70.1 2.9	41.07 0.02	66.0 2.8	62.42 0.01	33.6 2.4
28	42.94 0.12	73.0 2.6	41.05 0.07	68.8 2.6	62.41 0.05	36.0 2.2
Sept. 7	42.82 0.17	75.6 2.2	40.98 0.11	71.4 2.3	62.36 0.10	38.2 1.9
17	42.65 0.21	77.8 1.9	40.87 0.14	73.7 1.9	62.26 0.14	40.1 1.6
27	42.44 0.24	79.7 1.4	40.73 0.18	75.6 1.6	62.12 0.17	41.7 1.2
Oct. 7	42.20 0.25	81.1 0.9	40.55 0.20	77.2 1.1	61.95 0.17	42.9 0.9
17	41.95 0.26	82.0 0.5	40.35 0.21	78.3 0.7	61.78 0.18	43.8 0.5
27	41.69 0.26	82.5 0.0	40.14 0.21	79.0 0.2	61.60 0.18	44.3 0.0
Nov. 6	41.43 0.24	82.5 0.5	39.93 0.19	79.2 0.3	61.42 0.18	44.3 0.4
16	41.19 0.22	82.0 1.1	39.74 0.18	78.9 0.7	61.24 0.16	43.9 0.7
26	40.97 0.19	80.9 1.5	39.56 0.15	78.2 1.0	61.06 0.14	43.2 1.1
Dec. 6	40.78 0.16	79.4 1.9	39.41 0.13	77.2 1.5	60.94 0.12	42.1 1.4
16	40.62 0.11	77.5 2.3	39.28 0.10	75.7 2.0	60.82 0.08	40.7 1.8
26	40.51 0.07	75.2 2.6	39.18 0.06	73.7 2.3	60.74 0.05	38.9 2.1
36	40.44	72.6	39.12	71.4	60.69	36.8

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ CEPHEI.		$\beta$ AQUARI.		$\beta$ CEPHEI.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.
	<sup>h.</sup> 21 <sup>m.</sup> 15	<sup>°</sup> 61 <sup>'</sup> 59	<sup>h.</sup> 21 <sup>m.</sup> 24	<sup>°</sup> 6 <sup>'</sup> 10	<sup>h.</sup> 21 <sup>m.</sup> 26	<sup>°</sup> 69 <sup>'</sup> 56
Jan. 1	11.61 0.19	45.9 2.7	10.93 0.00	68.4 0.5	46.78 0.35	59.7 2.5
11	11.42 0.11	43.2 2.9	10.93 0.02	68.9 0.4	46.43 0.24	57.2 2.8
21	11.31 0.04	40.3 3.1	10.95 0.05	69.3 0.4	46.19 0.13	54.4 3.1
31	11.27 0.04	37.2 3.1	11.00 0.08	69.7 0.3	46.06 0.01	51.3 3.2
Feb. 10	11.31 0.13	34.1 3.1	11.08 0.12	70.0 0.1	46.05 0.09	48.1 3.2
20	11.44 0.19	31.0 3.0	11.20 0.15	70.1 0.2	46.14 0.22	44.9 3.1
March 1	11.63 0.27	28.0 2.6	11.35 0.18	69.9 0.3	46.36 0.32	41.8 2.8
11	11.90 0.34	25.4 2.1	11.53 0.20	69.6 0.6	46.68 0.42	39.0 2.4
21	12.24 0.41	23.3 1.6	11.73 0.23	69.0 0.8	47.10 0.52	36.6 1.9
31	12.65 0.46	21.7 1.0	11.96 0.26	68.2 1.1	47.62 0.59	34.7 1.2
April 10	13.11 0.50	20.7 0.5	12.22 0.29	67.1 1.3	48.21 0.64	33.5 0.7
20	13.61 0.53	20.2 0.2	12.51 0.30	65.8 1.5	48.85 0.67	32.8 0.2
30	14.14 0.54	20.4 0.8	12.81 0.31	64.3 1.6	49.52 0.69	32.6 0.5
May 10	14.68 0.52	21.2 1.4	13.12 0.31	62.7 1.8	50.21 0.69	33.1 1.1
20	15.20 0.50	22.6 2.0	13.43 0.32	60.9 1.8	50.90 0.66	34.2 1.7
30	15.70 0.47	24.6 2.4	13.75 0.31	59.1 1.8	51.56 0.62	35.9 2.2
June 9	16.17 0.43	27.0 2.3	14.06 0.29	57.3 1.8	52.18 0.56	38.1 2.6
19	16.60 0.36	29.8 3.2	14.35 0.26	55.5 1.8	52.74 0.49	40.7 3.1
29	16.96 0.30	33.0 3.5	14.61 0.24	53.7 1.6	53.23 0.39	43.8 3.4
July 9	17.26 0.22	36.5 3.6	14.85 0.20	52.1 1.4	53.62 0.29	47.2 3.5
19	17.48 0.15	40.1 3.7	15.05 0.17	50.7 1.3	53.91 0.19	50.7 3.7
29	17.63 0.07	43.8 3.7	15.22 0.12	49.4 1.1	54.10 0.08	54.4 3.8
Aug. 8	17.70 0.01	47.5 3.6	15.34 0.08	48.3 0.8	54.18 0.02	58.2 3.8
18	17.69 0.10	51.1 3.5	15.42 0.03	47.5 0.6	54.16 0.11	62.0 3.7
28	17.59 0.17	54.6 3.3	15.45 0.02	46.9 0.4	54.05 0.22	65.7 3.5
Sept. 7	17.42 0.23	57.9 3.0	15.43 0.05	46.5 0.3	53.83 0.32	69.2 3.2
17	17.19 0.28	60.9 2.7	15.38 0.09	46.2 0.0	53.51 0.39	72.4 2.9
27	16.91 0.34	63.6 2.3	15.29 0.11	46.2 0.1	53.12 0.47	75.3 2.6
Oct. 7	16.57 0.38	65.9 1.8	15.18 0.13	46.3 0.2	52.65 0.52	77.9 2.1
17	16.19 0.41	67.7 1.2	15.05 0.14	46.5 0.3	52.13 0.56	80.0 1.6
27	15.78 0.43	68.9 0.7	14.91 0.14	46.8 0.4	51.57 0.59	81.6 1.0
Nov. 6	15.35 0.41	69.6 0.2	14.77 0.13	47.2 0.5	50.98 0.60	82.6 0.5
16	14.94 0.39	69.8 0.3	14.64 0.11	47.7 0.5	50.38 0.59	83.1 0.0
26	14.55 0.37	69.5 1.0	14.53 0.10	48.2 0.5	49.79 0.57	83.1 0.6
Dec. 6	14.18 0.34	68.5 1.4	14.43 0.08	48.7 0.6	49.22 0.52	82.5 1.3
16	13.84 0.29	67.1 2.0	14.35 0.05	49.3 0.6	48.70 0.46	81.2 1.8
26	13.55 0.23	65.1 2.5	14.30 0.03	49.9 0.5	48.24 0.38	79.4 2.3
36	13.32	62.6	14.27	50.4	47.86	77.1

NOTE. — Before the 23d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	α Pegasi.		α AQUARI.		α Gruis.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.
	<sup>h.</sup> <sup>m.</sup> 21 37	<sup>°</sup> <sup>'</sup> 9 14	<sup>h.</sup> <sup>m.</sup> 21 58	<sup>°</sup> <sup>'</sup> 0 59	<sup>h.</sup> <sup>m.</sup> 21 59	<sup>°</sup> <sup>'</sup> 47 37
Jan. 1	18.30 0.01	7.2 1.3	35.40 0.02	55.6 0.7	23.55 0.07	82.5 1.5
11	18.29 0.00	5.9 1.2	35.38 0.01	56.3 0.7	23.48 0.03	81.0 1.3
21	18.29 0.02	4.7 1.2	35.37 0.01	57.0 0.6	23.45 0.01	79.2 2.1
31	18.31 0.06	3.5 1.1	35.38 0.05	57.6 0.5	23.46 0.06	77.1 2.3
Feb. 10	18.37 0.10	2.4 0.9	35.43 0.09	58.1 0.3	23.52 0.10	74.8 2.4
20	18.47 0.14	1.5 0.8	35.52 0.12	58.4 0.1	23.62 0.14	72.4 2.6
March 1	18.61 0.16	0.7 0.5	35.64 0.15	58.5 0.1	23.76 0.19	69.8 2.7
11	18.77 0.19	0.2 0.1	35.79 0.17	58.4 0.4	23.95 0.24	67.1 2.6
21	18.96 0.22	0.1 0.1	35.96 0.19	58.0 0.6	24.19 0.28	64.5 2.6
31	19.18 0.25	0.2 0.4	36.15 0.23	57.4 0.9	24.47 0.32	61.9 2.6
April 10	19.43 0.27	0.6 0.9	36.38 0.26	56.5 1.2	24.79 0.35	59.3 2.4
20	19.70 0.30	1.5 1.3	36.64 0.28	55.3 1.4	25.14 0.38	56.9 2.2
30	20.00 0.32	2.8 1.5	36.92 0.30	53.9 1.6	25.52 0.41	54.7 1.9
May 10	20.32 0.31	4.3 1.7	37.22 0.31	52.3 1.8	25.93 0.43	52.8 1.7
20	20.63 0.31	6.0 2.0	37.53 0.32	50.5 1.9	26.36 0.43	51.1 1.3
30	20.94 0.30	8.0 2.1	37.85 0.32	48.6 2.0	26.79 0.43	49.8 1.0
June 9	21.24 0.28	10.1 2.2	38.17 0.31	46.6 2.0	27.22 0.41	48.8 0.7
19	21.52 0.28	12.3 2.3	38.48 0.28	44.6 2.0	27.63 0.39	48.1 0.3
29	21.80 0.25	14.6 2.3	38.76 0.26	42.6 1.9	28.02 0.36	47.8 0.1
July 9	22.05 0.21	16.9 2.2	39.02 0.22	40.7 1.8	28.38 0.31	47.9 0.5
19	22.26 0.16	19.1 2.1	39.24 0.18	38.9 1.6	28.69 0.27	48.4 0.9
29	22.42 0.12	21.2 2.0	39.42 0.15	37.3 1.4	28.96 0.21	49.3 1.2
Aug. 8	22.54 0.08	23.2 1.7	39.57 0.10	35.9 1.2	29.17 0.14	50.5 1.4
18	22.62 0.04	24.9 1.5	39.67 0.06	34.7 1.0	29.31 0.08	51.9 1.7
28	22.66 0.00	26.4 1.3	39.73 0.01	33.7 0.8	29.39 0.01	53.6 1.8
Sept. 7	22.66 0.05	27.7 1.1	39.74 0.02	32.9 0.5	29.40 0.05	55.4 1.9
17	22.61 0.09	28.8 0.8	39.72 0.05	32.4 0.3	29.35 0.10	57.3 1.9
27	22.52 0.11	29.6 0.6	39.67 0.08	32.1 0.1	29.25 0.14	59.2 1.8
Oct. 7	22.41 0.12	30.2 0.3	39.59 0.10	32.0 0.0	29.11 0.18	61.0 1.5
17	22.29 0.13	30.5 0.1	39.49 0.13	32.0 0.2	28.93 0.22	62.5 1.2
27	22.16 0.14	30.6 0.1	39.36 0.13	32.2 0.3	28.71 0.23	63.7 0.9
Nov. 6	22.02 0.14	30.5 0.4	39.23 0.12	32.5 0.4	28.48 0.23	64.6 0.6
16	21.88 0.12	30.1 0.6	39.11 0.12	32.9 0.6	28.25 0.21	65.2 0.2
26	21.76 0.11	29.5 0.8	38.99 0.11	33.5 0.6	28.04 0.19	65.4 0.1
Dec. 6	21.65 0.09	28.7 0.9	38.88 0.09	34.1 0.7	27.85 0.18	65.3 0.6
16	21.56 0.07	27.8 1.1	38.79 0.08	34.8 0.7	27.67 0.15	64.7 1.0
26	21.49 0.04	26.7 1.2	38.71 0.05	35.5 0.7	27.52 0.11	63.7 1.3
36	21.45	25.5	38.66	36.2	27.41	62.4

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.



APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sideral Day of the Month.	† Pegasi.		α PISCIS AUSTRALIS. (Fomalhaut.)		α PEGASI. (Markab.)	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.
	<sup>h.</sup> 22 <sup>m.</sup> 34	<sup>°</sup> 10 <sup>'</sup> 6	<sup>h.</sup> 22 <sup>m.</sup> 49	<sup>°</sup> 30 <sup>'</sup> 21	<sup>h.</sup> 22 <sup>m.</sup> 57	<sup>°</sup> 14 <sup>'</sup> 27
Jan. 1	<sup>s.</sup> 28.65 <sup>s.</sup> 0.07	<sup>"</sup> 10.5 <sup>"</sup> 1.0	<sup>s.</sup> 54.72 <sup>s.</sup> 0.09	<sup>"</sup> 57.6 <sup>"</sup> 0.5	<sup>s.</sup> 47.40 <sup>s.</sup> 0.08	<sup>"</sup> 16.7 <sup>"</sup> 1.1
11	28.58 0.04	9.5 1.1	54.63 0.06	57.1 0.8	47.32 0.06	15.6 1.2
21	28.54 0.02	8.4 1.1	54.57 0.03	56.3 1.0	47.26 0.04	14.4 1.2
31	28.52 0.00	7.3 1.0	54.54 0.00	55.3 1.2	47.22 0.01	13.2 1.2
Feb. 10	28.52 0.04	6.3 0.8	54.54 0.03	54.1 1.5	47.21 0.01	12.0 1.1
20	28.56 0.08	5.5 0.9	54.57 0.07	52.6 1.8	47.22 0.03	10.9 1.0
March 1	28.64 0.10	4.6 0.6	54.64 0.10	50.8 1.9	47.25 0.07	9.9 0.8
11	28.74 0.14	4.0 0.2	54.74 0.14	48.9 2.0	47.32 0.12	9.1 0.4
21	28.88 0.17	3.8 0.1	54.88 0.17	46.9 2.2	47.44 0.17	8.7 0.2
31	29.05 0.21	3.9 0.4	55.05 0.21	44.7 2.3	47.61 0.20	8.5 0.1
April 10	29.26 0.24	4.3 0.7	55.26 0.25	42.4 2.4	47.81 0.23	8.6 0.5
20	29.50 0.27	5.0 1.0	55.51 0.28	40.0 2.4	48.04 0.25	9.1 0.8
30	29.77 0.29	6.0 1.3	55.79 0.31	37.6 2.3	48.29 0.28	9.9 1.1
May 10	30.06 0.31	7.3 1.7	56.10 0.34	35.3 2.1	48.57 0.31	11.0 1.5
20	30.37 0.33	9.0 1.9	56.44 0.35	33.2 2.0	48.88 0.33	12.5 1.8
30	30.70 0.33	10.9 2.1	56.79 0.36	31.2 1.8	49.21 0.33	14.3 2.0
June 9	31.03 0.31	13.0 2.2	57.15 0.35	29.4 1.6	49.54 0.32	16.3 2.1
19	31.34 0.30	15.2 2.2	57.50 0.34	27.8 1.3	49.86 0.31	18.4 2.3
29	31.64 0.27	17.4 2.3	57.84 0.33	26.5 1.0	50.17 0.29	20.7 2.4
July 9	31.91 0.25	19.7 2.2	58.17 0.29	25.5 0.6	50.46 0.26	23.1 2.4
19	32.16 0.22	21.9 2.2	58.46 0.26	24.9 0.3	50.72 0.24	25.5 2.3
29	32.38 0.18	24.1 2.1	58.72 0.22	24.6 0.0	50.96 0.20	27.8 2.2
Aug. 8	32.56 0.13	26.2 1.9	58.94 0.17	24.6 0.4	51.16 0.16	30.0 2.1
18	32.69 0.09	28.1 1.6	59.11 0.13	25.0 0.7	51.32 0.12	32.1 1.9
28	32.78 0.04	29.7 1.4	59.24 0.08	25.7 1.0	51.44 0.08	34.0 1.7
Sept. 7	32.82 0.01	31.1 1.2	59.32 0.02	26.7 1.1	51.52 0.03	35.7 1.5
17	32.83 0.02	32.3 1.0	59.34 0.02	27.8 1.3	51.55 0.01	37.2 1.2
27	32.81 0.05	33.3 0.8	59.32 0.06	29.1 1.4	51.54 0.04	38.4 1.0
Oct. 7	32.76 0.08	34.1 0.5	59.26 0.09	30.5 1.3	51.50 0.06	39.4 0.8
17	32.68 0.11	34.6 0.2	59.17 0.11	31.8 1.3	51.44 0.09	40.2 0.5
27	32.57 0.12	34.8 0.0	59.06 0.13	33.1 1.2	51.35 0.11	40.7 0.2
Nov. 6	32.45 0.12	34.8 0.2	58.93 0.15	34.3 1.0	51.24 0.11	40.9 0.0
16	32.33 0.11	34.6 0.4	58.78 0.15	35.3 0.7	51.13 0.12	40.9 0.3
26	32.22 0.11	34.2 0.6	58.63 0.15	36.0 0.5	51.01 0.12	40.6 0.5
Dec. 6	32.11 0.11	33.6 0.7	58.48 0.13	36.5 0.3	50.89 0.11	40.1 0.7
16	32.00 0.10	32.9 0.9	58.35 0.12	36.8 0.0	50.78 0.11	39.4 0.8
26	31.90 0.08	32.0 1.1	58.23 0.10	36.8 0.3	50.67 0.09	38.6 1.1
36	31.82	30.9	58.13	36.5	50.58	37.5

NOTE. — Before the 22d of March the Sideral day of the Month begins at the Sideral Oh. after the Mean Noon;



## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	♈ Piscium.			γ Cephei.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.
	h. m.		°	h. m.		°
	23 32		4	23 33		76
	<sup>a.</sup> <sup>s.</sup>		<sup>a.</sup> <sup>s.</sup>	<sup>a.</sup> <sup>s.</sup>		<sup>a.</sup> <sup>s.</sup>
Jan. 1	45.40 0.09		52 8.9 0.8	35.16 0.85		51 27.1 0.9
11	45.31 0.07		52 8.1 0.7	34.31 0.73		51 26.2 1.5
21	45.24 0.06		52 7.4 0.7	33.58 0.62		51 24.7 2.0
31	45.18 0.04		52 6.7 0.6	32.96 0.51		51 22.7 2.4
Feb. 10	45.14 0.02		52 6.1 0.6	32.45 0.38		51 20.3 2.7
20	45.12 0.01		52 5.5 0.5	32.07 0.22		51 17.6 3.1
March 1	45.13 0.05		52 5.0 0.2	31.85 0.06		51 14.5 3.1
11	45.18 0.08		52 4.8 0.0	31.79 0.12		51 11.4 3.0
21	45.26 0.12		52 4.8 0.3	31.91 0.30		51 8.4 2.9
31	45.38 0.16		52 5.1 0.6	32.21 0.47		51 5.5 2.5
April 10	45.54 0.20		52 5.7 0.9	32.68 0.63		51 3.0 2.2
20	45.74 0.23		52 6.6 1.2	33.31 0.79		51 0.8 1.8
30	45.97 0.26		52 7.8 1.4	34.10 0.89		50 59.0 1.2
May 10	46.23 0.23		52 9.2 1.6	34.99 0.97		50 57.8 0.7
20	46.51 0.31		52 10.8 1.8	35.96 1.02		50 57.1 0.0
30	46.82 0.32		52 12.6 2.0	36.98 1.05		50 57.1 0.6
June 9	47.14 0.32		52 14.6 2.1	38.03 1.04		50 57.7 1.1
19	47.46 0.32		52 16.7 2.1	39.07 0.98		50 58.8 1.5
29	47.78 0.31		52 18.8 2.1	40.05 0.92		51 0.3 2.0
July 9	48.09 0.29		52 20.9 2.0	40.97 0.86		51 2.3 2.5
19	48.38 0.26		52 22.9 2.0	41.83 0.76		51 4.8 3.1
29	48.64 0.23		52 24.9 1.8	42.59 0.65		51 7.9 3.4
Aug. 8	48.87 0.19		52 26.7 1.6	43.24 0.50		51 11.3 3.5
18	49.06 0.16		52 28.3 1.4	43.74 0.37		51 14.8 3.7
28	49.22 0.11		52 29.7 1.2	44.11 0.23		51 18.5 3.8
Sept. 7	49.33 0.07		52 30.9 0.9	44.34 0.09		51 22.3 3.8
17	49.40 0.03		52 31.8 0.6	44.43 0.05		51 26.1 3.8
27	49.43 0.00		52 32.4 0.4	44.38 0.19		51 29.9 3.7
Oct. 7	49.43 0.03		52 32.8 0.3	44.19 0.33		51 33.6 3.4
17	49.40 0.05		52 33.1 0.1	43.86 0.45		51 37.0 3.2
27	49.35 0.07		52 33.2 0.1	43.41 0.55		51 40.2 2.9
Nov. 6	49.28 0.09		52 33.1 0.3	42.86 0.66		51 43.1 2.3
16	49.19 0.10		52 32.8 0.5	42.20 0.74		51 45.4 1.8
26	49.09 0.11		52 32.3 0.6	41.46 0.81		51 47.2 1.2
Dec. 6	48.98 0.10		52 31.7 0.6	40.65 0.84		51 48.4 0.6
16	48.88 0.10		52 31.1 0.7	39.81 0.86		51 49.0 0.1
26	48.78 0.10		52 30.4 0.8	38.95 0.83		51 49.1 0.6
36	48.68		52 29.6	38.12		51 48.5

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.



TABLE GIVING THE CORRECTION OF THREE OF THE POLAR STARS  
FOR TERMS OF NUTATION INVOLVING  $2\zeta$ .

$\Delta \text{ or } \delta - 180^\circ$	51 Cephei		$\sigma$ Octanis.		$\lambda$ Urs. Min.		$\Delta \text{ or } \delta - 180^\circ$		$\Delta \text{ or } \delta - 180^\circ$	51 Cephei		$\sigma$ Octanis.		$\lambda$ Urs. Min.		$\Delta \text{ or } \delta - 180^\circ$
	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.				R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	
0	+.018	+.09	-.025	-.09	-.159	-.08	90		45	-.122	+.01	-.436	+.01	+.224	-.04	135
1	.014	.09	.040	.09	.151	.08	91		46	.123	.00	.435	.01	.229	.04	136
2	.009	.09	.055	.09	.143	.08	92		47	.124	.00	.433	.02	.234	.04	137
3	.005	.09	.070	.09	.135	.08	93		48	.124	+.00	.431	.02	.239	.04	138
4	+.001	.09	.085	.09	.127	.08	94		49	.124	-.01	.428	.02	.244	.04	139
5	-.003	+.09	-.100	-.09	-.118	-.08	95		50	-.124	-.01	-.425	+.02	+.249	-.03	140
6	.008	.09	.115	.08	.109	.08	96		51	.123	.01	.421	.03	.253	.03	141
7	.012	.09	.130	.08	.100	.08	97		52	.123	.02	.417	.03	.256	.03	142
8	.017	.09	.144	.08	.091	.08	98		53	.122	.02	.412	.03	.259	.02	143
9	.021	.09	.158	.08	.082	.08	99		54	.122	.02	.407	.04	.262	.02	144
10	-.025	+.09	-.172	-.08	-.073	-.09	100		55	-.121	-.02	-.401	+.04	+.255	-.02	145
11	.029	.09	.186	.08	.064	.09	101		56	.121	.03	.395	.04	.267	.02	146
12	.033	.09	.200	.08	.055	.09	102		57	.120	.03	.389	.04	.269	.01	147
13	.037	.08	.213	.08	.046	.09	103		58	.119	.03	.382	.05	.271	.01	148
14	.041	.08	.226	.08	.036	.09	104		59	.117	.04	.374	.05	.273	-.01	149
15	-.045	+.08	-.239	-.08	-.026	-.09	105		60	-.115	-.04	-.365	+.05	+.274	+.00	150
16	.049	.08	.251	.07	.017	.09	106		61	.114	.04	.356	.05	.275	.00	151
17	.053	.08	.263	.07	-.008	.09	107		62	.112	.04	.347	.06	.275	.00	152
18	.056	.08	.275	.07	+.002	.09	108		63	.110	.05	.338	.06	.275	.01	153
19	.060	.08	.287	.07	.012	.09	109		64	.108	.05	.328	.06	.275	.01	154
20	-.065	+.08	-.299	-.07	+.022	-.09	110		65	-.106	-.05	-.318	+.06	+.275	+.01	155
21	.069	.07	.310	.07	.032	.09	111		66	.102	.06	.307	.07	.274	.02	156
22	.073	.07	.320	.06	.041	.09	112		67	.100	.06	.296	.07	.272	.02	157
23	.076	.07	.330	.06	.050	.08	113		68	.098	.06	.284	.07	.270	.02	158
24	.079	.07	.340	.06	.060	.08	114		69	.095	.06	.272	.07	.268	.02	159
25	-.082	+.07	-.350	-.06	+.070	-.08	115		70	-.093	-.06	-.261	+.07	+.266	+.03	160
26	.085	.06	.359	.05	.079	.08	116		71	.090	.07	.249	.08	.263	.03	161
27	.088	.06	.368	.05	.088	.08	117		72	.087	.07	.237	.08	.260	.03	162
28	.091	.06	.376	.05	.097	.08	118		73	.084	.07	.224	.08	.257	.04	163
29	.094	.05	.383	.04	.106	.08	119		74	.080	.07	.211	.08	.254	.04	164
30	-.097	+.05	-.390	-.04	+.115	-.08	120		75	-.077	-.07	-.197	+.08	+.250	+.04	165
31	.100	.05	.396	.04	.124	.08	121		76	.074	.08	.183	.09	.246	.04	166
32	.103	.05	.402	.03	.133	.08	122		77	.070	.08	.169	.09	.242	.05	167
33	.105	.04	.408	.03	.142	.07	123		78	.066	.08	.155	.09	.237	.05	168
34	.107	.04	.413	.03	.150	.07	124		79	.062	.08	.141	.09	.232	.05	169
35	-.109	+.04	-.418	-.02	+.158	-.07	125		80	-.059	-.08	-.126	+.09	+.227	+.06	170
36	.111	.04	.423	.02	.165	.07	126		81	.055	.08	.111	.09	.221	.06	171
37	.113	.03	.427	.02	.172	.06	127		82	.050	.08	.096	.09	.215	.06	172
38	.115	.03	.430	-.01	.179	.06	128		83	.047	.09	.081	.09	.209	.06	173
39	.116	.03	.432	+.01	.186	.06	129		84	.043	.09	.066	.09	.203	.06	174
40	-.117	+.03	-.434	+.01	+.193	-.06	130		85	-.039	-.09	-.051	+.09	+.196	+.07	175
41	.118	.02	.435	.00	.199	.05	131		86	.035	.09	.036	.09	.189	.07	176
42	.119	.02	.436	.00	.206	.05	132		87	.030	.09	.021	.09	.182	.07	177
43	.120	.01	.436	.00	.212	.05	133		88	.026	.09	-.006	.09	.175	.07	178
44	.121	.01	.436	.00	.218	.05	134		89	.022	.09	+.009	.09	.167	.07	179
45	.122	.01	.436	+.01	+.224	-.04	135		90	-.018	-.09	+.025	+.09	+.159	+.08	180

NOTE. — When the Argument is on the right-hand side of the Table, the sign of the correction is to be reversed.



# SOLAR EPHEMERIS, 1860. 299

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Ap- parent Noon.	Mean Noon.	Ap- parent Noon.	Right Ascension.	Declination.				
Jan. 1	h. m. s. 18 46 2.80	s. 3.47	° ' " 23 2 11.2	10.8	11.045	12.16	+ 3 42.88	16 18.42	1 11.11	18 42 19.98
2	18 50 27.65	28.43	22 57 6.1	5.4	11.030	13.99	4 11.18	16 18.41	1 11.06	18 46 16.54
3	18 54 52.11	52.98	22 51 33.4	32.4	11.013	14.43	4 39.09	16 18.41	1 11.01	18 50 13.10
4	18 59 16.18	17.12	22 45 33.4	32.1	10.995	15.56	5 6.61	16 18.40	1 10.96	18 54 9.66
5	19 3 39.83	40.87	22 39 6.5	5.0	10.976	16.68	5 33.71	16 18.39	1 10.90	18 58 6.22
6	19 8 3.03	4.15	22 32 12.7	11.0	10.956	17.80	6 0.36	16 18.36	1 10.84	19 2 2.77
7	19 12 25.75	26.95	22 24 52.3	50.4	10.937	18.90	6 26.52	16 18.33	1 10.78	19 5 59.33
8	19 16 47.97	49.25	22 17 5.4	3.2	10.915	19.99	6 52.19	16 18.30	1 10.71	19 9 55.89
9	19 21 9.68	11.02	22 8 52.3	49.8	10.893	21.08	7 17.35	16 18.27	1 10.63	19 13 52.45
10	19 25 30.85	32.26	22 0 13.2	10.4	10.870	22.16	7 41.97	16 18.23	1 10.55	19 17 49.01
11	19 29 51.46	52.94	21 51 8.3	5.2	10.846	23.23	8 6.02	16 18.18	1 10.47	19 21 45.57
12	19 34 11.50	13.04	21 41 37.9	34.5	10.822	24.29	8 29.50	16 18.12	1 10.39	19 25 42.13
13	19 38 30.94	32.54	21 31 42.2	38.5	10.796	25.34	8 52.39	16 18.05	1 10.30	19 29 38.68
14	19 42 49.76	51.42	21 21 21.6	17.6	10.770	26.37	9 14.65	16 17.98	1 10.21	19 33 35.24
15	19 47 7.94	9.66	21 10 36.2	31.9	10.744	27.39	9 36.28	16 17.91	1 10.12	19 37 31.80
16	19 51 25.48	27.26	20 59 26.4	21.8	10.717	28.40	9 57.26	16 17.83	1 10.03	19 41 28.36
17	19 55 42.34	44.18	20 47 52.5	47.6	10.689	29.40	10 17.56	16 17.74	1 9.93	19 45 24.92
18	19 59 58.51	60.40	20 35 54.9	49.7	10.660	30.39	10 37.18	16 17.65	1 9.83	19 49 21.47
19	20 4 13.97	15.91	20 23 33.7	28.1	10.629	31.36	10 56.00	16 17.56	1 9.73	19 53 18.03
20	20 8 28.71	30.70	20 10 49.4	43.4	10.598	32.32	11 14.26	16 17.47	1 9.63	19 57 14.59
21	20 12 42.71	44.74	19 57 42.4	36.0	10.567	33.26	11 31.70	16 17.37	1 9.53	20 1 11.15
22	20 16 55.94	58.01	19 44 13.1	6.4	10.535	34.18	11 48.38	16 17.27	1 9.43	20 5 7.70
23	20 21 8.40	10.51	19 30 21.7	14.7	10.503	35.09	12 4.28	16 17.16	1 9.32	20 9 4.26
24	20 25 30.08	22.23	19 16 8.6	1.3	10.470	35.98	12 19.39	16 17.05	1 9.21	20 13 0.82
25	20 29 30.95	33.14	19 1 34.4	26.8	10.436	36.86	12 33.69	16 16.93	1 9.10	20 16 57.38
26	20 33 41.01	43.23	18 46 39.3	31.3	10.402	37.72	12 47.20	16 16.81	1 8.99	20 20 53.93
27	20 37 50.23	52.50	18 31 23.8	15.5	10.368	38.57	12 59.88	16 16.69	1 8.88	20 24 50.49
28	20 41 58.66	60.93	18 15 43.3	39.7	10.334	39.38	13 11.72	16 16.57	1 8.76	20 28 47.05
29	20 46 6.23	8.52	17 59 53.2	44.3	10.299	40.19	13 22.73	16 16.44	1 8.64	20 32 43.60
30	20 50 12.97	15.30	17 43 38.9	29.7	10.264	40.99	13 32.90	16 16.31	1 8.52	20 36 40.16
31	20 54 18.86	21.19	17 26 65.8	56.3	10.228	41.76	13 42.24	16 16.17	1 8.41	20 40 36.71
Feb. 1	20 58 23.91	26.26	17 10 14.3	4.5	10.193	42.52	13 50.73	16 16.03	1 8.30	20 44 33.27
2	21 2 28.12	30.49	16 52 64.7	54.6	10.158	43.27	13 58.37	16 15.89	1 8.19	20 48 29.83
3	21 6 31.49	35.87	16 35 37.6	27.3	10.123	43.99	14 5.18	16 15.74	1 8.07	20 52 26.38
4	21 10 34.03	36.42	16 17 53.3	42.8	10.189	44.70	14 11.15	16 15.59	1 7.95	20 56 22.94
5	21 14 35.74	38.14	15 59 52.1	41.4	10.055	45.40	14 16.31	16 15.42	1 7.84	21 0 19.49
6	21 18 36.64	39.04	15 41 34.5	23.6	10.021	46.07	14 20.64	16 15.25	1 7.73	21 4 16.05
7	21 22 36.74	39.14	15 22 60.9	49.8	9.987	46.72	14 24.17	16 15.08	1 7.62	21 8 12.61
8	21 26 36.02	38.42	15 4 11.7	0.4	9.953	47.36	14 26.89	16 14.90	1 7.51	21 12 9.16
9	21 30 34.52	36.92	14 44 67.2	55.7	9.921	48.00	14 28.82	16 14.72	1 7.39	21 16 5.72
10	21 34 32.24	34.63	14 25 47.8	36.1	9.889	48.61	14 29.98	16 14.53	1 7.28	21 20 2.27
11	21 38 29.20	31.58	14 6 13.9	2.0	9.857	49.20	14 30.37	16 14.34	1 7.16	21 23 58.83
12	21 42 25.40	27.77	13 46 26.0	14.0	9.825	49.78	14 30.00	16 14.14	1 7.04	21 27 55.39
13	21 46 20.85	23.21	13 26 24.3	12.2	9.795	50.34	14 28.90	16 13.94	1 6.93	21 31 51.94
14	21 50 15.56	17.91	13 5 69.4	57.2	9.765	50.88	14 27.04	16 13.74	1 6.82	21 35 48.50
15	21 54 9.55	11.89	12 45 41.7	29.4	9.735	51.41	14 24.48	16 13.53	1 6.72	21 39 45.05
16	21 58 2.83	5.16	12 24 61.5	49.1	9.705	51.92	14 21.20	16 13.32	1 6.62	21 43 41.61
17	22 1 55.40	57.71	12 4 9.3	56.8	9.676	52.41	14 17.21	16 13.11	1 6.52	21 47 38.16
18	22 5 47.28	49.57	11 42 65.6	53.1	9.647	52.89	14 12.52	16 12.90	1 6.42	21 51 34.72
19	22 9 38.48	40.75	11 21 50.7	38.2	9.619	53.34	14 7.16	16 12.67	1 6.32	21 55 31.27
20	22 13 29.01	31.26	11 0 25.1	12.6	9.592	53.78	14 1.13	16 12.45	1 6.22	21 59 27.83
21	22 17 18.88	21.10	10 38 49.3	36.8	9.565	54.20	13 54.45	16 12.23	1 6.12	22 3 24.38
22	22 21 8.10	10.29	10 16 63.5	51.0	9.538	54.60	13 47.11	16 12.01	1 6.03	22 7 20.93
23	22 24 56.68	58.84	9 54 68.3	55.8	9.511	54.98	13 39.12	16 11.78	1 5.94	22 11 17.49
24	22 28 44.63	46.76	9 32 64.3	51.9	9.486	55.34	13 30.51	16 11.55	1 5.85	22 15 14.04
25	22 32 31.97	34.07	9 10 51.8	39.4	9.461	55.69	13 21.29	16 11.32	1 5.76	22 19 10.60
26	22 36 18.71	20.78	8 48 31.0	18.8	9.437	56.02	13 11.48	16 11.09	1 5.68	22 23 7.15
27	22 40 4.87	6.91	8 25 62.7	50.6	9.413	56.33	13 1.09	16 10.86	1 5.60	22 27 3.70
28	22 43 50.48	52.49	8 3 27.1	15.1	9.389	56.62	12 50.13	16 10.63	1 5.53	22 31 0.26
29	22 47 35.55	37.52	7 40 44.6	32.7	9.366	56.91	12 38.64	16 10.39	1 5.46	22 34 56.81
30	22 51 20.07	22.01	7 17 55.6	43.8	9.344	57.17	12 26.61	16 10.15	1 5.38	22 38 53.36
31	22 55 4.06	5.96	6 54 60.5	48.8	9.324	57.41	+12 14.04	16 9.91	1 5.31	22 42 49.92

NOTE. — For Mean Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.



# 300 SOLAR EPHEMERIS, 1860.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.				
Mar.	h. m. s.	s.	° ' "	"	s.	"	m. s.	' "	m. s.	h. m. s.
	1 22 51 20.07	22.01	— 7 17 55.6	43.8	9.344	57.17	+12 26.61	16 10.15	1 5.38	22 38 53.36
	2 22 55 4.06	5.96	6 54 60.5	48.8	9.324	57.41	12 14.04	16 9.91	1 5.31	22 42 49.92
	3 22 58 47.55	49.41	6 31 59.7	48.1	9.304	57.64	12 0.98	16 9.67	1 5.24	22 46 46.47
	4 23 2 30.57	32.39	6 8 53.6	42.2	9.284	57.86	11 47.45	16 9.42	1 5.17	22 50 43.02
	5 23 6 13.14	14.92	5 45 42.5	31.8	9.265	58.06	11 33.45	16 9.16	1 5.11	22 54 39.58
	6 23 9 55.30	57.04	5 22 26.8	15.8	9.247	58.25	11 19.06	16 8.90	1 5.05	22 58 36.13
	7 23 13 37.05	38.75	4 58 66.8	56.0	9.231	58.41	11 4.25	16 8.64	1 4.99	23 2 32.69
	8 23 17 18.43	20.09	4 35 42.9	32.3	9.216	58.56	10 49.07	16 8.38	1 4.93	23 6 29.25
	9 23 20 59.44	61.06	4 12 15.4	5.0	9.202	58.70	10 33.53	16 8.12	1 4.88	23 10 25.80
	10 23 24 40.12	41.70	3 48 44.7	84.5	9.188	58.84	10 17.65	16 7.88	1 4.83	23 14 22.35
	11 23 28 20.49	22.03	3 25 11.2	1.2	9.175	58.95	10 1.48	16 7.59	1 4.78	23 18 18.90
	12 23 32 0.57	2.07	3 1 35.2	25.5	9.164	59.04	9 45.00	16 7.32	1 4.74	23 22 15.46
	13 23 35 40.39	41.85	2 37 57.1	47.7	9.154	59.12	9 28.27	16 7.05	1 4.70	23 26 12.01
	14 23 39 19.96	21.37	2 14 17.1	8.0	9.144	59.19	9 11.28	16 6.77	1 4.66	23 30 8.57
	15 23 42 59.31	60.67	1 50 35.8	27.0	9.135	59.24	8 54.08	16 6.49	1 4.63	23 34 5.12
	16 23 46 38.46	39.78	1 26 33.5	45.0	9.128	59.27	8 36.69	16 6.22	1 4.60	23 38 1.67
	17 23 50 17.42	18.70	1 3 10.5	2.3	9.121	59.29	8 19.11	16 5.95	1 4.57	23 41 58.22
	18 23 53 56.22	57.45	0 39 27.3	19.4	9.114	59.29	8 1.35	16 5.67	1 4.55	23 45 54.78
	19 23 57 34.87	36.05	0 15 44.2	36.6	9.108	59.29	7 43.45	16 5.39	1 4.53	23 49 51.33
	20 0 1 13.39	14.52	+ 0 7 58.4	65.8	9.102	59.27	7 25.41	16 5.11	1 4.51	23 53 47.88
	21 0 4 51.80	52.88	0 31 40.2	47.2	9.099	59.22	7 7.27	16 4.84	1 4.49	23 57 44.44
	22 0 8 30.12	31.15	0 55 20.6	27.3	9.096	59.14	6 49.04	16 4.57	1 4.48	0 1 40.99
	23 0 12 8.38	9.36	1 18 59.2	65.6	9.093	59.06	6 30.75	16 4.29	1 4.47	0 5 37.54
	24 0 15 46.58	47.51	1 42 35.8	41.9	9.090	58.97	6 12.40	16 4.01	1 4.46	0 9 34.09
	25 0 19 24.72	25.61	2 6 10.0	15.8	9.088	58.86	5 53.99	16 3.73	1 4.46	0 13 30.65
	26 0 23 2.81	3.65	2 29 41.3	46.8	9.088	58.74	5 35.53	16 3.45	1 4.46	0 17 27.30
	27 0 26 40.86	41.65	2 53 9.3	14.5	9.088	58.60	5 17.03	16 3.17	1 4.46	0 21 23.75
	28 0 30 18.93	19.67	3 16 33.9	38.8	9.089	58.44	4 58.54	16 2.90	1 4.46	0 25 20.31
	29 0 33 57.04	57.74	3 39 54.6	59.2	9.090	58.27	4 50.11	16 2.63	1 4.46	0 29 16.86
	30 0 37 35.22	35.88	4 3 11.0	15.3	9.093	58.11	4 31.74	16 2.36	1 4.47	0 33 13.42
Apr.	31 0 41 13.48	14.09	4 26 22.9	26.9	9.096	57.89	4 3.45	16 2.08	1 4.48	0 37 9.97
	1 0 44 51.83	52.39	4 49 29.8	33.5	9.100	57.67	3 45.25	16 1.81	1 4.50	0 41 6.52
	2 0 48 30.29	30.80	5 12 31.5	34.9	9.105	57.45	3 27.15	16 1.54	1 4.52	0 45 3.08
	3 0 52 8.86	9.33	5 35 27.6	30.7	9.110	57.21	3 9.18	16 1.27	1 4.54	0 48 59.63
	4 0 55 47.58	48.01	5 58 17.8	20.6	9.116	56.96	2 51.35	16 1.00	1 4.57	0 52 56.19
	5 0 59 26.47	26.85	6 21 1.9	4.4	9.124	56.69	2 33.69	16 0.72	1 4.61	0 56 52.74
	6 1 3 5.55	5.89	6 43 39.3	41.5	9.132	56.43	2 16.22	16 0.44	1 4.64	1 0 49.29
	7 1 6 44.85	45.15	7 6 10.2	12.1	9.141	56.13	1 58.96	16 0.17	1 4.67	1 4 45.85
	8 1 10 24.39	24.65	7 28 33.7	35.3	9.151	55.82	1 41.96	15 59.90	1 4.71	1 8 42.40
	9 1 14 4.19	4.41	7 50 49.9	51.3	9.163	55.50	1 25.21	15 59.63	1 4.75	1 12 38.96
	10 1 17 44.26	44.43	8 12 58.2	59.3	9.175	55.17	1 8.73	15 59.35	1 4.79	1 16 35.51
	11 1 21 24.63	24.76	8 34 58.4	59.2	9.188	54.83	0 52.55	15 59.07	1 4.83	1 20 32.06
	12 1 25 5.33	5.42	8 56 50.1	50.6	9.201	54.47	0 36.69	15 58.80	1 4.87	1 24 28.62
	13 1 28 46.36	46.41	9 18 33.0	33.3	9.216	54.10	0 21.18	15 58.53	1 4.92	1 28 25.17
	14 1 32 27.74	27.75	9 40 6.9	7.0	9.231	53.71	+ 0 6.02	15 58.26	1 4.97	1 32 21.72
	15 1 36 9.47	9.44	10 1 31.2	31.1	9.247	53.31	— 0 8.81	15 57.99	1 5.02	1 36 18.28
	16 1 39 51.58	51.51	10 22 43.7	45.4	9.264	52.89	0 23.25	15 57.72	1 5.07	1 40 14.83
	17 1 43 34.09	33.98	10 43 50.0	49.5	9.281	52.45	0 37.29	15 57.45	1 5.13	1 44 11.38
	18 1 47 17.01	16.87	11 4 43.8	43.1	9.298	52.00	0 50.93	15 57.18	1 5.19	1 48 7.94
	19 1 51 0.34	0.17	11 25 26.6	25.7	9.315	51.55	1 4.14	15 56.91	1 5.25	1 52 4.49
	20 1 54 44.10	43.99	11 45 58.1	57.0	9.333	51.08	1 16.94	15 56.65	1 5.31	1 56 1.05
	21 1 58 28.29	28.15	12 6 18.1	16.8	9.351	50.58	1 29.30	15 56.40	1 5.37	1 59 57.60
	22 2 2 12.93	12.76	12 26 26.1	24.6	9.370	50.08	1 41.22	15 56.15	1 5.44	2 3 54.16
	23 2 5 58.02	57.72	12 46 21.8	20.2	9.389	49.56	1 52.68	15 55.90	1 5.51	2 7 50.71
	24 2 9 43.57	43.24	13 6 5.0	3.3	9.408	49.02	2 3.68	15 55.65	1 5.58	2 11 47.27
	25 2 13 29.59	29.23	13 25 35.1	33.3	9.428	48.47	2 14.21	15 55.41	1 5.65	2 15 43.82
	26 2 17 16.08	15.69	13 44 51.8	49.9	9.448	47.91	2 24.28	15 55.17	1 5.72	2 19 40.38
	27 2 21 3.06	2.65	14 3 55.0	53.0	9.468	47.34	2 33.85	15 54.93	1 5.79	2 23 36.93
	28 2 24 50.53	50.10	14 22 44.1	42.0	9.488	46.75	2 42.94	15 54.69	1 5.87	2 27 33.49
	29 2 28 38.50	38.05	14 41 19.0	16.8	9.508	46.15	2 51.53	15 54.45	1 5.95	2 31 30.05
	30 2 32 26.98	26.51	14 59 39.4	37.1	9.530	45.54	2 59.60	15 54.22	1 6.03	2 35 26.60
	31 2 36 15.99	15.50	+15 17 44.9	42.5	9.552	44.92	— 3 7.15	15 53.99	1 6.11	2 39 23.16

NOTE. — For Mean Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.



# SOLAR EPHEMERIS, 1860. 301

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Ap- parent Noon.	Mean Noon.	Ap- parent Noon.	Right Ascension.	Declination.				
	h. m. s.	s.	° ' "	° ' "	s. "	"	m. s.	"	m. s.	h. m. s.
May 1	2 36 15.99	15.50	+15 17 44.9	42.5	9.552	44.92	- 3 7.15	15 53.99	1 6.11	2 39 23.16
2	2 40 5.52	5.01	15 35 35.2	32.7	9.574	44.28	3 14.17	15 53.76	1 6.19	2 43 19.71
3	2 43 55.58	55.05	15 53 10.0	7.5	9.597	43.63	3 20.67	15 53.53	1 6.27	2 47 16.27
4	2 47 46.20	45.65	16 10 29.1	26.6	9.620	42.97	3 26.61	15 53.31	1 6.35	2 51 12.82
5	2 51 37.38	36.81	16 27 32.2	29.7	9.643	42.29	3 31.99	15 53.08	1 6.48	2 55 9.38
6	2 55 29.12	28.54	16 44 18.9	16.4	9.667	41.60	3 36.80	15 52.86	1 6.51	2 59 5.93
7	2 59 21.42	20.83	17 0 49.1	46.6	9.691	40.91	3 41.06	15 52.64	1 6.59	3 3 2.49
8	3 3 14.31	13.71	17 16 62.4	59.9	9.715	40.20	3 44.73	15 52.42	1 6.67	3 6 59.05
9	3 7 7.79	7.18	17 32 58.5	56.0	9.740	39.48	3 47.80	15 52.20	1 6.76	3 10 55.60
10	3 11 1.86	1.24	17 48 37.1	34.6	9.765	38.74	3 50.29	15 51.99	1 6.85	3 14 52.16
11	3 14 56.52	53.89	18 3 57.9	55.4	9.790	37.99	3 52.19	15 51.78	1 6.93	3 18 48.71
12	3 18 51.77	51.13	18 18 60.6	58.1	9.815	37.23	3 53.50	15 51.57	1 7.01	3 22 45.27
13	3 22 47.62	46.98	18 33 45.0	42.6	9.840	36.46	3 54.52	15 51.36	1 7.09	3 26 41.82
14	3 26 44.06	43.42	18 48 10.7	8.4	9.864	35.67	3 54.32	15 51.15	1 7.17	3 30 38.38
15	3 30 41.09	40.45	19 2 17.4	15.2	9.888	34.88	3 53.85	15 50.95	1 7.25	3 34 34.94
16	3 34 38.70	38.06	19 16 4.9	2.8	9.912	34.07	3 52.80	15 50.76	1 7.33	3 38 31.50
17	3 38 36.89	36.25	19 29 32.8	30.8	9.936	33.25	3 51.16	15 50.57	1 7.41	3 42 28.05
18	3 42 35.65	35.02	19 42 40.9	38.9	9.960	32.42	3 48.96	15 50.38	1 7.49	3 46 24.61
19	3 46 34.97	34.34	19 55 28.9	26.9	9.983	31.58	3 46.21	15 50.19	1 7.57	3 50 21.17
20	3 50 34.85	34.23	20 7 56.5	54.6	10.005	30.73	3 42.89	15 50.01	1 7.65	3 54 17.73
21	3 54 35.26	34.65	20 20 3.6	1.8	10.027	29.86	3 39.08	15 49.84	1 7.73	3 58 14.28
22	3 58 36.20	35.60	20 31 49.7	48.0	10.049	28.98	3 34.65	15 49.67	1 7.80	4 2 10.84
23	4 2 37.65	37.06	20 43 14.7	13.1	10.070	28.10	3 29.76	15 49.51	1 7.87	4 6 7.40
24	4 6 39.60	39.02	20 54 18.3	16.7	10.091	27.20	3 24.37	15 49.35	1 7.94	4 10 3.96
25	4 10 42.04	41.47	21 4 60.3	58.8	10.111	26.30	3 18.48	15 49.19	1 8.01	4 14 0.51
26	4 14 44.95	44.40	21 15 20.4	19.0	10.133	25.38	3 12.13	15 49.04	1 8.08	4 17 57.07
27	4 18 48.32	47.79	21 25 18.5	17.2	10.152	24.46	3 5.32	15 48.89	1 8.15	4 21 53.63
28	4 22 52.15	51.64	21 34 54.5	53.3	10.169	23.53	2 58.05	15 48.74	1 8.21	4 25 50.19
29	4 26 56.41	55.92	21 44 8.1	7.0	10.186	22.60	2 50.35	15 48.61	1 8.27	4 29 46.75
30	4 31 1.07	0.60	21 52 59.0	58.0	10.203	21.65	2 42.24	15 48.47	1 8.33	4 33 43.30
31	4 35 6.14	5.70	22 1 27.2	26.3	10.220	20.69	2 33.78	15 48.34	1 8.39	4 37 39.86
June 1	4 39 11.61	11.20	22 9 32.3	31.5	10.236	19.73	2 24.82	15 48.21	1 8.45	4 41 36.42
2	4 43 17.47	17.09	22 17 14.3	13.6	10.252	18.77	2 15.51	15 48.08	1 8.50	4 45 32.97
3	4 47 23.70	23.34	22 24 33.1	32.5	10.267	17.80	2 5.84	15 47.95	1 8.55	4 49 29.53
4	4 51 30.29	29.96	22 31 28.5	28.0	10.281	16.82	1 55.81	15 47.82	1 8.60	4 53 26.09
5	4 55 37.21	36.91	22 37 60.3	59.9	10.295	15.83	1 45.45	15 47.70	1 8.65	4 57 22.65
6	4 59 44.45	44.18	22 44 8.3	8.0	10.308	14.85	1 34.76	15 47.58	1 8.69	5 1 19.20
7	5 3 52.01	51.77	22 49 52.5	52.2	10.321	13.85	1 23.76	15 47.47	1 8.73	5 5 15.76
8	5 7 59.86	59.65	22 55 12.8	12.5	10.332	12.85	1 12.47	15 47.36	1 8.77	5 9 12.32
9	5 12 7.99	7.81	23 0 8.9	8.7	10.343	11.84	1 0.89	15 47.25	1 8.81	5 13 8.88
10	5 16 16.38	16.23	23 4 40.8	40.7	10.353	10.83	0 49.06	15 47.15	1 8.84	5 17 5.44
11	5 20 25.00	24.89	23 8 48.3	48.3	10.363	9.81	0 37.00	15 47.05	1 8.87	5 21 2.00
12	5 24 33.84	33.77	23 12 31.4	31.4	10.372	8.79	0 24.72	15 46.96	1 8.89	5 24 58.56
13	5 28 42.87	42.84	23 15 49.9	49.9	10.379	7.77	0 12.24	15 46.88	1 8.91	5 28 55.11
14	5 32 52.07	52.07	23 18 43.9	43.9	10.385	6.74	+ 0 0.40	15 46.80	1 8.93	5 32 51.67
15	5 37 1.41	1.44	23 21 13.2	13.2	10.390	5.71	0 13.18	15 46.72	1 8.94	5 36 48.23
16	5 41 10.88	10.95	23 23 17.8	17.8	10.395	4.68	0 26.09	15 46.65	1 8.95	5 40 44.79
17	5 45 20.42	20.53	23 24 57.6	57.6	10.398	3.64	0 39.07	15 46.58	1 8.96	5 44 41.35
18	5 49 30.02	30.17	23 26 12.5	12.5	10.400	2.61	0 52.12	15 46.52	1 8.97	5 48 37.91
19	5 53 39.67	39.86	23 27 2.6	2.6	10.400	1.57	1 5.21	15 46.46	1 8.97	5 52 34.47
20	5 57 49.33	49.56	23 27 27.9	27.9	10.399	0.54	1 18.31	15 46.41	1 8.97	5 56 31.03
21	6 1 58.96	59.23	23 27 28.3	28.3	10.398	0.50	1 31.38	15 46.36	1 8.97	6 0 27.59
22	6 6 8.53	8.84	23 27 3.8	3.8	10.396	1.54	1 44.40	15 46.32	1 8.96	6 4 24.14
23	6 10 18.04	18.38	23 26 14.6	14.5	10.393	2.57	1 57.36	15 46.28	1 8.96	6 8 20.70
24	6 14 27.46	27.84	23 25 0.7	0.6	10.389	3.59	2 10.22	15 46.26	1 8.96	6 12 17.26
25	6 18 36.74	37.16	23 23 22.1	22.0	10.384	4.61	2 22.94	15 46.24	1 8.95	6 16 13.82
26	6 22 45.86	46.32	23 21 18.8	18.6	10.376	5.64	2 35.50	15 46.22	1 8.92	6 20 10.38
27	6 26 54.80	55.29	23 18 51.0	50.7	10.368	6.66	2 47.89	15 46.20	1 8.89	6 24 6.93
28	6 31 3.54	4.06	23 15 58.7	58.3	10.360	7.68	3 0.07	15 46.18	1 8.86	6 28 3.49
29	6 35 12.07	12.63	23 12 41.9	41.5	10.351	8.70	3 12.04	15 46.17	1 8.83	6 32 0.05
30	6 39 20.38	20.97	23 9 0.8	0.3	10.341	9.71	3 23.79	15 46.16	1 8.80	6 35 56.61
31	6 43 28.42	29.04	+23 4 55.5	54.9	10.329	10.72	+ 3 35.28	15 46.15	1 8.77	6 39 53.16

NOTE. — For Mean Interval of Semidiameter passing the Meridian, subtract 0.18 from the Sidereal Interval.



# 302 SOLAR EPHEMERIS, 1860.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi- diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Ap- parent Noon.	Mean Noon.	Ap- parent Noon.	Right Ascen- sion.	Declina- tion.				
July	h. m. s.	s.	° ' "	"	s.	"	m. s.	' "	m. s.	h. m. s.
	6 43 28.42	29.04	+23 4 55.5	54.9	10.329	10.72	+ 3 35.28	15 46.15	1 8.77	6 39 53.16
	6 47 36.19	36.84	23 0 26.0	25.3	10.317	11.72	3 46.50	15 46.16	1 8.73	6 43 49.72
	6 51 43.67	44.35	22 55 32.5	31.7	10.304	12.72	3 57.42	15 46.17	1 8.68	6 47 46.28
	6 55 50.85	51.56	22 50 15.1	14.2	10.291	13.72	4 8.04	15 46.18	1 8.63	6 51 42.84
	6 59 57.70	58.44	22 44 33.8	32.8	10.278	14.71	4 18.33	15 46.19	1 8.58	6 55 39.40
	7 4 4.21	4.98	22 38 28.8	27.7	10.264	15.69	4 28.28	15 46.20	1 8.53	6 59 35.96
	7 8 10.88	11.18	22 31 60.3	59.1	10.250	16.67	4 37.89	15 46.22	1 8.48	7 3 32.52
	7 12 16.18	17.00	22 25 8.4	7.0	10.234	17.65	4 57.04	15 46.25	1 8.43	7 7 29.07
	7 16 21.59	22.44	22 17 53.2	51.7	10.218	18.62	4 55.99	15 46.28	1 8.38	7 11 25.63
	7 20 26.61	27.47	22 10 14.8	13.2	10.201	19.58	5 4.45	15 46.31	1 8.32	7 15 22.19
	7 24 31.21	32.09	22 2 13.5	11.8	10.184	20.53	5 12.49	15 46.34	1 8.26	7 19 18.75
	7 28 35.38	36.28	21 53 49.4	47.6	10.166	21.47	5 20.10	15 46.37	1 8.19	7 23 15.31
	7 32 39.10	40.02	21 45 2.8	0.8	10.146	22.41	5 27.26	15 46.41	1 8.12	7 27 11.87
	7 36 42.35	43.29	21 35 53.8	51.7	10.126	23.34	5 33.95	15 46.46	1 8.05	7 31 8.43
	7 40 45.12	46.08	21 26 22.6	20.4	10.106	24.26	5 40.17	15 46.51	1 7.98	7 35 4.98
	7 44 47.39	48.36	21 16 29.4	27.1	10.084	25.16	5 45.88	15 46.57	1 7.91	7 39 1.54
	7 48 49.15	50.13	21 6 14.6	12.2	10.063	26.06	5 51.08	15 46.63	1 7.84	7 42 58.10
	7 52 50.38	51.37	20 55 38.2	35.6	10.039	26.95	5 55.74	15 46.71	1 7.76	7 46 54.66
	7 56 51.07	52.07	20 44 40.7	37.9	10.016	27.84	5 59.88	15 46.79	1 7.68	7 50 51.21
	8 0 51.21	52.22	20 33 22.1	19.2	9.993	28.70	6 3.46	15 46.87	1 7.60	7 54 47.77
	8 4 50.77	51.79	20 21 42.9	39.9	9.970	29.56	6 6.46	15 46.95	1 7.52	7 58 44.33
	8 8 49.76	50.78	20 9 43.2	40.1	9.946	30.41	6 8.90	15 47.04	1 7.44	8 2 40.88
	8 12 48.16	49.18	19 57 23.4	20.2	9.922	31.25	6 10.73	15 47.14	1 7.36	8 6 37.44
	8 16 45.97	46.99	19 44 43.6	40.3	9.897	32.07	6 11.98	15 47.24	1 7.28	8 10 34.00
	8 20 43.17	44.19	19 31 44.2	40.8	9.872	32.87	6 12.63	15 47.35	1 7.20	8 14 30.55
	8 24 39.75	40.77	19 18 25.5	22.0	9.846	33.67	6 12.64	15 47.46	1 7.12	8 18 27.11
	8 28 35.71	36.73	19 4 47.6	44.0	9.820	34.47	6 12.03	15 47.58	1 7.03	8 22 23.67
	8 32 31.06	32.07	18 50 51.0	47.4	9.794	35.24	6 10.83	15 47.70	1 6.94	8 26 20.22
	8 36 25.79	26.79	18 36 35.8	32.1	9.768	36.01	6 9.01	15 47.82	1 6.86	8 30 16.78
	8 40 19.91	20.90	18 21 62.3	58.5	9.742	36.77	6 6.56	15 47.94	1 6.78	8 34 13.34
8 44 13.42	14.40	18 7 10.8	7.0	9.717	37.52	6 3.52	15 48.07	1 6.69	8 38 9.89	
Aug.	8 48 6.32	7.29	17 51 61.5	57.7	9.692	38.25	5 59.85	15 48.20	1 6.60	8 42 6.45
	8 51 58.62	59.58	17 36 34.8	31.0	9.667	38.97	5 55.59	15 48.33	1 6.51	8 46 3.01
	8 55 50.31	51.25	17 20 50.9	47.1	9.642	39.69	5 50.73	15 48.46	1 6.42	8 49 59.56
	8 59 41.41	42.33	17 4 50.0	46.2	9.617	40.38	5 45.27	15 48.60	1 6.33	8 53 56.12
	9 3 31.92	32.82	16 48 32.4	28.6	9.593	41.07	5 39.22	15 48.74	1 6.24	8 57 52.68
	9 7 21.85	22.73	16 31 58.4	58.6	9.569	41.75	5 32.60	15 48.88	1 6.15	9 1 49.23
	9 11 11.21	11.87	16 15 8.4	4.6	9.545	42.41	5 25.39	15 49.03	1 6.07	9 5 45.79
	9 15 0.00	0.84	15 57 62.5	58.7	9.521	43.07	5 17.62	15 49.18	1 5.98	9 9 42.35
	9 18 48.23	49.05	15 40 41.1	37.3	9.498	43.70	5 9.31	15 49.33	1 5.90	9 13 38.90
	9 22 35.90	36.69	15 23 4.5	0.7	9.475	44.33	5 0.41	15 49.49	1 5.82	9 17 35.46
	9 26 23.02	23.78	15 5 13.0	9.3	9.452	44.94	4 50.98	15 49.66	1 5.74	9 21 32.01
	9 30 9.60	10.33	14 47 6.9	3.3	9.430	45.54	4 41.00	15 49.83	1 5.66	9 25 28.57
	9 33 55.64	56.34	14 28 46.5	43.0	9.408	46.13	4 30.49	15 50.00	1 5.58	9 29 25.12
	9 37 41.16	41.83	14 10 12.1	8.7	9.386	46.71	4 19.45	15 50.17	1 5.50	9 33 21.68
	9 41 26.16	26.80	13 51 24.2	20.9	9.364	47.27	4 7.90	15 50.35	1 5.42	9 37 18.23
	9 45 10.65	11.26	13 32 23.0	19.8	9.342	47.81	3 55.83	15 50.53	1 5.35	9 41 14.79
	9 48 54.62	55.20	13 13 8.9	5.9	9.321	48.34	3 43.25	15 50.72	1 5.28	9 45 11.34
	9 52 38.07	38.62	12 53 42.2	39.3	9.300	48.87	3 30.14	15 50.91	1 5.21	9 49 7.90
	9 56 21.02	21.53	12 34 3.3	0.5	9.280	49.36	3 16.54	15 51.11	1 5.14	9 53 4.45
	10 0 3.47	3.94	12 14 12.5	9.9	9.260	49.85	3 2.43	15 51.31	1 5.07	9 57 1.01
	10 3 45.44	45.87	11 54 10.1	7.7	9.240	50.33	2 47.85	15 51.51	1 4.00	10 0 57.56
10 7 26.95	27.34	11 33 56.5	54.3	9.220	50.80	2 32.80	15 51.72	1 4.93	10 4 54.12	
10 11 8.01	8.36	11 13 32.0	30.0	9.201	51.24	2 17.32	15 51.93	1 4.87	10 8 50.67	
10 14 48.63	48.94	10 52 56.9	55.1	9.183	51.68	2 1.39	15 52.15	1 4.81	10 12 47.23	
10 18 28.82	29.09	10 32 11.6	10.0	9.166	52.10	1 45.03	15 52.37	1 4.75	10 16 43.78	
10 22 8.60	8.83	10 11 16.3	14.9	9.149	52.50	1 28.25	15 52.59	1 4.69	10 20 40.34	
10 25 47.98	48.16	9 50 11.4	10.3	9.133	52.89	1 11.08	15 52.82	1 4.63	10 24 36.89	
10 29 26.98	27.12	9 28 57.2	56.3	9.118	53.28	0 53.53	15 53.05	1 4.58	10 28 33.44	
10 33 5.62	5.72	9 7 34.0	33.4	9.104	53.65	0 35.62	15 53.28	1 4.53	10 32 30.00	
10 36 43.92	43.97	8 46 2.0	1.7	9.090	54.00	+ 0 17.36	15 53.51	1 4.48	10 36 26.56	
10 40 21.90	21.90	+ 8 24 21.5	21.5	9.076	54.34	- 0 1.21	15 53.74	1 4.44	10 40 23.11	

NOTE. — For Mean Interval of Semidiameter passing the Meridian, subtract 0s.13 from the Sidereal Interval.



# SOLAR EPHEMERIS, 1860. 303

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.				
Sept. 1	h. m. s.	s.	° ' "	"	"	"	m. s.	"	m. s.	h. m. s.
1	10 43 59.57	59.52	+ 8 2 33.0	33.3	9.063	54.68	0 20.03	15 53.97	1 4.39	10 44 19.66
2	10 47 36.96	36.87	7 40 36.6	37.2	9.052	55.00	0 39.25	15 54.20	1 4.35	10 48 16.22
3	10 51 14.09	13.95	7 18 32.7	33.6	9.041	55.31	0 58.67	15 54.43	1 4.31	10 52 12.77
4	10 54 50.99	50.80	6 56 21.5	22.7	9.031	55.60	1 18.32	15 54.66	1 4.27	10 56 9.32
5	10 58 27.67	27.43	6 34 3.4	4.9	9.023	55.89	1 38.19	15 54.90	1 4.24	11 0 5.88
6	11 2 4.14	3.85	6 11 38.7	40.5	9.016	56.16	1 58.26	15 55.14	1 4.21	11 4 2.43
7	11 5 40.43	40.09	5 49 7.7	9.8	9.009	56.42	2 18.52	15 55.38	1 4.18	11 7 58.98
8	11 9 16.56	16.17	5 26 30.6	33.0	9.003	56.66	2 38.95	15 55.62	1 4.16	11 11 55.54
9	11 12 52.55	52.11	5 3 48.0	50.7	8.997	56.89	2 59.51	15 55.86	1 4.14	11 15 52.09
10	11 16 28.42	27.93	4 41 0.0	3.1	8.992	57.10	3 20.18	15 56.11	1 4.12	11 19 48.64
11	11 20 4.19	3.64	4 18 7.1	10.6	8.988	57.30	3 40.96	15 56.36	1 4.10	11 23 45.20
12	11 23 39.87	39.27	3 55 9.6	13.4	8.986	57.48	4 1.83	15 56.62	1 4.08	11 27 41.75
13	11 27 15.47	14.82	3 32 7.8	11.9	8.984	57.65	4 22.74	15 56.88	1 4.07	11 31 38.30
14	11 30 51.01	50.31	3 9 2.2	6.6	8.982	57.80	4 43.78	15 57.14	1 4.06	11 35 34.85
15	11 34 26.51	25.76	2 45 53.0	57.8	8.980	57.95	5 4.83	15 57.40	1 4.06	11 39 31.41
16	11 38 2.00	1.19	2 22 40.6	45.8	8.979	58.08	5 25.88	15 57.66	1 4.06	11 43 27.96
17	11 41 37.48	36.62	1 59 25.4	30.9	8.979	58.19	5 46.95	15 57.93	1 4.06	11 47 24.51
18	11 45 12.96	12.05	1 36 7.8	13.6	8.980	58.28	6 8.02	15 58.20	1 4.06	11 51 21.06
19	11 48 48.48	47.52	1 12 48.1	54.2	8.981	58.35	6 29.06	15 58.47	1 4.07	11 55 17.62
20	11 52 24.05	23.03	0 49 26.7	33.2	8.983	58.41	6 50.04	15 58.74	1 4.08	11 59 14.18
21	11 55 59.67	58.59	0 26 3.9	10.8	8.986	58.47	7 10.96	15 59.01	1 4.09	12 3 10.73
22	11 59 35.38	34.24	+ 0 2 40.0	47.2	8.989	58.51	7 31.80	15 59.29	1 4.11	12 7 7.28
23	12 3 11.19	10.00	0 20 44.6	37.1	8.993	58.53	7 52.55	15 59.57	1 4.13	12 11 3.84
24	12 6 47.13	45.89	0 44 9.5	1.7	8.999	58.54	8 13.16	15 59.85	1 4.15	12 15 0.39
25	12 10 23.20	21.91	1 7 34.5	26.3	9.006	58.54	8 33.64	16 0.13	1 4.18	12 18 56.94
26	12 13 59.44	58.10	1 30 59.2	50.6	9.014	58.51	8 53.94	16 0.41	1 4.21	12 22 53.50
27	12 17 35.88	34.49	1 54 23.3	14.3	9.023	58.48	9 14.05	16 0.69	1 4.24	12 26 50.05
28	12 21 12.53	11.09	2 17 46.5	37.2	9.031	58.44	9 33.95	16 0.97	1 4.28	12 30 46.60
29	12 24 49.41	47.92	2 40 68.3	58.7	9.041	58.38	9 53.63	16 1.25	1 4.32	12 34 43.16
30	12 28 26.56	25.02	2 54 28.6	18.7	9.053	58.30	10 13.02	16 1.52	1 4.36	12 38 39.71
Oct. 1	12 32 3.98	2.39	3 27 47.0	36.8	9.065	58.22	10 32.14	16 1.79	1 4.40	12 42 36.26
2	12 35 41.72	40.08	3 50 63.2	52.7	9.078	58.12	10 50.96	16 2.07	1 4.45	12 46 32.82
3	12 39 19.79	18.10	4 14 16.8	6.0	9.092	58.00	11 9.44	16 2.35	1 4.50	12 50 29.37
4	12 42 58.22	56.48	4 37 27.4	16.3	9.109	57.87	11 27.56	16 2.62	1 4.55	12 54 25.92
5	12 46 37.02	35.23	5 0 34.8	23.5	9.126	57.73	11 45.31	16 2.89	1 4.60	12 58 22.47
6	12 50 16.23	14.39	5 23 38.6	27.1	9.143	57.57	12 2.66	16 3.16	1 4.66	13 2 19.03
7	12 53 55.85	53.96	5 46 38.4	26.6	9.161	57.40	12 19.59	16 3.44	1 4.72	13 6 15.58
8	12 57 35.92	33.98	6 9 33.8	21.8	9.180	57.21	12 36.07	16 3.71	1 4.78	13 10 12.13
9	1 1 16.45	14.47	6 32 24.4	12.2	9.199	57.00	12 52.10	16 3.98	1 4.85	13 14 8.69
10	1 4 57.45	55.43	6 54 69.9	57.5	9.218	56.78	13 7.65	16 4.25	1 4.92	13 18 5.24
11	1 8 38.95	36.89	7 17 49.8	37.3	9.239	56.54	13 22.70	16 4.52	1 4.99	13 22 1.79
12	1 12 20.97	18.87	7 40 23.8	11.0	9.262	56.28	13 37.24	16 4.79	1 5.08	13 25 58.35
13	1 16 3.51	1.37	8 2 51.5	38.5	9.284	56.01	13 51.25	16 5.06	1 5.16	13 29 54.90
14	1 19 46.60	44.42	8 24 72.5	59.5	9.307	55.72	14 4.72	16 5.33	1 5.24	13 33 51.46
15	1 23 30.24	28.02	8 47 26.3	13.2	9.330	55.41	14 17.64	16 5.60	1 5.32	13 37 48.01
16	1 27 14.46	12.20	9 9 32.5	19.2	9.354	55.09	14 29.98	16 5.88	1 5.40	13 41 44.56
17	1 30 59.27	56.97	9 31 30.8	17.4	9.378	54.75	14 41.73	16 6.16	1 5.49	13 45 41.12
18	1 34 44.67	42.33	9 53 20.7	7.2	9.403	54.39	14 52.88	16 6.44	1 5.58	13 49 37.67
19	1 38 30.68	28.31	10 14 61.8	48.2	9.429	54.02	15 3.43	16 6.72	1 5.67	13 53 34.23
20	1 42 17.32	14.92	10 36 33.8	20.2	9.456	53.62	15 13.36	16 6.99	1 5.76	13 57 30.79
21	1 46 4.59	2.16	10 57 56.2	42.6	9.483	53.22	15 22.65	16 7.26	1 5.86	14 1 27.34
22	1 49 52.52	50.06	11 18 68.7	55.1	9.511	52.80	15 31.27	16 7.53	1 5.96	14 5 23.89
23	1 53 41.11	38.62	11 39 70.8	57.2	9.540	52.36	15 39.25	16 7.80	1 6.06	14 9 20.45
24	1 57 30.39	27.87	12 0 62.2	48.6	9.569	51.91	15 46.53	16 8.07	1 6.16	14 13 17.00
25	1 1 20.37	17.83	12 21 42.5	38.9	9.598	51.44	15 53.11	16 8.34	1 6.26	14 17 13.55
26	1 5 11.07	8.51	12 41 71.3	57.7	9.627	50.95	15 58.98	16 8.60	1 6.37	14 21 10.11
27	1 8 62.49	59.91	13 2 28.2	14.7	9.657	50.45	16 4.11	16 8.86	1 6.48	14 25 6.66
28	1 12 54.65	52.05	13 22 32.9	19.5	9.689	49.93	16 8.52	16 9.12	1 6.59	14 29 3.22
29	1 16 47.57	44.95	13 42 24.9	11.6	9.720	49.39	16 12.16	16 9.37	1 6.70	14 32 59.77
30	1 20 41.26	38.62	14 1 63.9	50.7	9.753	48.84	16 15.04	16 9.62	1 6.81	14 36 56.33
31	1 24 35.73	33.08	14 21 29.5	16.4	9.787	48.28	16 17.13	16 9.87	1 6.92	14 40 52.88
32	1 28 31.01	28.36	14 40 41.3	28.3	9.821	47.69	16 18.41	16 10.11	1 7.03	14 44 49.43

NOTE. — For Mean Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.



# 304 SOLAR EPHEMERIS, 1860.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.				
	h. m. s.	s.	° ' "	"	s.	"	m. s.	"	m. s.	h. m. s.
Nov. 1	14 28 31.01	28.36	14 40 41.3	28.3	9.821	47.69	16 18.41	16 10.11	1 7.03	14 44 49.43
2	14 32 27.13	24.46	14 59 38.9	26.0	9.855	47.09	16 18.86	16 10.35	1 7.14	14 48 45.99
3	14 36 24.09	21.41	15 18 21.9	9.2	9.890	46.48	16 18.47	16 10.59	1 7.26	14 52 42.55
4	14 40 21.89	19.20	15 36 49.9	37.4	9.925	45.85	16 17.23	16 10.83	1 7.38	14 56 39.10
5	14 44 20.63	17.84	15 54 62.6	50.3	9.961	45.19	16 15.16	16 11.06	1 7.50	15 0 35.66
6	14 48 20.01	17.33	16 12 59.4	47.3	9.997	44.53	16 12.23	16 11.29	1 7.61	15 4 32.21
7	14 52 20.34	17.66	16 30 89.8	27.9	10.033	43.84	16 8.47	16 11.52	1 7.74	15 8 28.77
8	14 56 21.53	18.85	16 47 63.6	51.9	10.069	43.14	16 3.85	16 11.75	1 7.86	15 12 25.33
9	15 0 23.59	20.91	17 4 70.4	59.0	10.105	42.41	15 58.36	16 11.97	1 7.98	15 16 21.89
10	15 4 26.51	23.83	17 21 59.6	48.5	10.140	41.68	15 52.00	16 12.19	1 8.10	15 20 18.44
11	15 8 30.29	27.62	17 38 30.9	20.1	10.176	40.93	15 44.79	16 12.41	1 8.22	15 24 15.01
12	15 12 34.94	32.28	17 54 43.9	33.4	10.211	40.16	15 36.69	16 12.63	1 8.34	15 28 11.55
13	15 16 40.44	37.80	18 10 38.1	27.9	10.246	39.36	15 27.76	16 12.84	1 8.46	15 32 8.11
14	15 20 46.78	44.16	18 26 13.1	3.2	10.281	38.55	15 17.99	16 13.05	1 8.58	15 36 4.67
15	15 24 53.96	51.36	18 41 28.6	19.0	10.316	37.72	15 7.37	16 13.26	1 8.70	15 40 1.22
16	15 28 61.98	59.40	18 56 24.1	14.8	10.350	36.89	14 55.91	16 13.48	1 8.82	15 43 57.78
17	15 33 10.83	8.28	19 10 59.2	50.2	10.384	36.04	14 43.63	16 13.69	1 8.94	15 47 54.34
18	15 37 20.49	17.97	19 25 13.6	4.9	10.418	35.16	14 30.53	16 13.89	1 9.06	15 51 50.89
19	15 41 30.95	28.46	19 38 67.0	58.7	10.451	34.28	14 16.64	16 14.09	1 9.16	15 55 47.45
20	15 45 42.19	39.74	19 52 88.8	30.9	10.484	33.38	14 1.96	16 14.28	1 9.27	15 59 44.00
21	15 49 54.22	51.81	20 5 48.8	41.3	10.517	32.47	13 46.49	16 14.48	1 9.38	16 3 40.56
22	15 54 7.02	4.65	20 18 36.7	29.6	10.549	31.53	13 30.25	16 14.67	1 9.49	16 7 37.12
23	15 58 20.59	18.27	20 30 62.0	55.3	10.581	30.59	13 13.23	16 14.86	1 9.60	16 11 33.67
24	16 2 34.93	32.66	20 42 64.5	58.1	10.613	29.62	12 55.46	16 15.04	1 9.70	16 15 30.23
25	16 6 50.00	47.77	20 54 43.9	37.8	10.643	28.64	12 36.96	16 15.22	1 9.80	16 19 26.79
26	16 11 5.80	3.62	21 5 59.7	54.0	10.673	27.67	12 17.71	16 15.39	1 9.90	16 23 23.34
27	16 15 22.31	20.18	21 16 51.7	46.4	10.702	26.67	11 57.76	16 15.55	1 10.00	16 27 19.90
28	16 19 39.53	37.46	21 27 19.7	14.7	10.731	25.66	11 37.10	16 15.72	1 10.10	16 31 16.46
29	16 23 57.44	55.43	21 37 23.2	18.5	10.760	24.63	11 15.75	16 15.87	1 10.20	16 35 13.02
30	16 28 16.03	14.07	21 46 62.0	57.6	10.788	23.60	10 53.72	16 16.02	1 10.29	16 39 9.58
Dec. 1	16 32 35.27	33.37	21 56 15.9	11.9	10.815	22.56	10 31.03	16 16.17	1 10.38	16 43 6.13
2	16 36 55.15	53.32	22 5 4.4	0.7	10.841	21.50	10 7.71	16 16.31	1 10.46	16 47 2.69
3	16 41 15.65	13.89	22 13 27.4	24.0	10.866	20.42	9 43.77	16 16.45	1 10.54	16 50 59.25
4	16 45 36.76	35.07	22 21 24.6	21.5	10.891	19.34	9 19.22	16 16.58	1 10.61	16 54 55.81
5	16 49 58.44	56.82	22 28 55.7	52.9	10.915	18.26	8 54.09	16 16.70	1 10.68	16 58 52.37
6	16 54 20.67	19.12	22 35 60.5	58.0	10.936	17.16	8 28.42	16 16.82	1 10.75	17 2 48.93
7	16 58 43.42	41.95	22 42 38.8	36.6	10.957	16.05	8 2.22	16 16.93	1 10.81	17 6 45.48
8	17 3 6.67	5.28	22 48 50.2	48.3	10.977	14.91	7 35.52	16 17.04	1 10.87	17 10 42.04
9	17 7 30.38	29.08	22 54 34.7	33.0	10.997	13.79	7 8.36	16 17.15	1 10.93	17 14 38.60
10	17 11 54.52	53.29	22 59 52.0	50.5	11.014	12.65	6 40.77	16 17.25	1 10.99	17 18 35.16
11	17 16 19.06	17.91	23 4 41.9	40.6	11.030	11.52	6 12.79	16 17.35	1 11.04	17 22 31.72
12	17 20 43.96	42.90	23 9 4.3	3.2	11.045	10.37	5 44.44	16 17.45	1 11.08	17 26 28.28
13	17 25 9.19	8.22	23 12 59.1	58.2	11.058	9.22	5 15.75	16 17.55	1 11.12	17 30 24.83
14	17 29 34.71	33.83	23 16 26.0	25.3	11.069	8.05	4 46.78	16 17.64	1 11.16	17 34 21.39
15	17 33 60.49	59.70	23 19 25.0	24.5	11.079	6.88	4 17.55	16 17.72	1 11.20	17 38 17.95
16	17 38 26.48	25.78	23 21 56.0	55.6	11.086	5.71	3 48.11	16 17.80	1 11.22	17 42 14.51
17	17 42 52.65	52.04	23 23 58.9	58.6	11.092	4.54	3 18.48	16 17.88	1 11.24	17 46 11.06
18	17 47 18.96	18.44	23 25 33.7	33.5	11.097	3.36	2 48.72	16 17.95	1 11.26	17 50 7.62
19	17 51 45.37	44.94	23 26 40.3	40.2	11.102	2.19	2 18.86	16 18.02	1 11.28	17 54 4.18
20	17 56 11.86	11.52	23 27 18.7	18.7	11.104	1.01	1 48.92	16 18.09	1 11.30	17 58 0.74
21	18 0 38.39	38.14	23 27 28.8	28.8	11.104	0.17	1 18.94	16 18.15	1 11.30	18 1 57.30
22	18 5 4.92	4.76	23 27 10.6	10.6	11.104	1.35	0 48.96	16 18.20	1 11.30	18 5 53.86
23	18 9 31.42	31.36	23 26 24.0	24.0	11.102	2.53	0 19.01	16 18.25	1 11.30	18 9 50.42
24	18 13 57.85	57.89	23 25 9.1	9.1	11.099	3.71	+ 0 10.88	16 18.30	1 11.30	18 13 46.97
25	18 18 24.19	24.32	23 23 26.1	26.1	11.095	4.88	0 40.67	16 18.34	1 11.29	18 17 43.53
26	18 22 50.41	50.63	23 21 14.9	14.9	11.090	6.05	1 10.34	16 18.37	1 11.27	18 21 40.09
27	18 27 16.48	16.79	23 18 35.6	35.4	11.082	7.22	1 39.86	16 18.39	1 11.24	18 25 36.65
28	18 31 42.37	42.77	23 15 28.3	28.0	11.074	8.38	2 9.20	16 18.40	1 11.21	18 29 33.21
29	18 36 8.05	8.54	23 11 53.0	52.6	11.065	9.54	2 38.33	16 18.41	1 11.18	18 33 29.77
30	18 40 33.49	34.07	23 7 50.0	49.5	11.055	10.70	3 7.22	16 18.42	1 11.15	18 37 26.33
31	18 44 58.67	59.34	23 3 19.2	18.5	11.043	11.85	3 35.85	16 18.42	1 11.11	18 41 22.89
32	18 49 23.55	24.31	22 58 20.8	19.9	11.030	13.00	+ 4 4.18	16 18.42	1 11.07	18 45 19.45

NOTE. — For Mean Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.



# MOON CULMINATIONS, 1860. 305

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
Jan. 1	d. 1	I. U.	h. m. s. 0 53 5.30	2.06766	s. 63.31	° 10 57 7.7	+2.90511
1	1	I. L.	1 16 48.85	2.08239	64.42	+13 35 17.6	+2.88997
2	2	I. U.	1 41 25.30	2.09837	65.72	+16 6 59.1	+2.86855
2	2	I. L.	2 7 3.41	2.11816	67.17	+18 30 2.2	+2.83860
3	3	I. U.	2 33 51.45	2.13789	68.74	+20 41 56.5	+2.79724
3	3	I. L.	3 1 55.44	2.15803	70.37	+22 39 50.8	+2.73983
4	4	I. U.	3 31 18.52	2.17751	72.00	+24 20 36.6	+2.65823
4	4	I. L.	4 1 59.66	2.19532	73.53	+25 40 53.7	+2.53724
5	5	I. U.	4 33 52.62	2.21035	74.84	+26 37 23.4	+2.33794
5	5	I. L.	5 6 48.30	2.22146	75.83	+27 7 6.4	+1.88897
6	6	I. U.	5 40 20.17	2.22809	76.41	+27 7 41.5	—1.86136
6	6	I. L.	6 14 15.65	2.23002	76.57	+26 37 45.5	—2.35570
7	7	I. U.	6 48 8.76	2.22694	76.29	+25 37 5.8	—2.57862
8	7	II. L.	7 24 9.14	2.21948	75.62	+24 6 47.9	—2.71795
8	8	II. U.	7 56 54.69	2.20860	74.63	+22 9 4.8	—2.81442
9	8	II. L.	8 28 46.13	2.19540	73.46	+19 47 5.1	—2.88349
9	9	II. U.	8 59 37.51	2.18107	72.24	+17 4 34.0	—2.93311
10	9	II. L.	9 29 28.23	2.16664	71.04	+14 5 34.2	—2.96810
10	10	II. U.	9 58 21.90	2.15311	69.93	+10 54 12.5	—2.99164
11	10	II. L.	10 26 25.33	2.14123	68.98	+ 7 34 25.9	—3.00584
11	11	II. U.	10 53 47.29	2.13156	68.22	+ 4 9 57.3	—3.01214
12	11	II. L.	11 20 37.61	2.12437	67.67	+ 0 44 11.7	—3.01145
12	12	II. U.	11 47 6.48	2.11992	67.32	— 2 39 44.2	—3.00442
13	12	II. L.	12 13 24.12	2.11819	67.20	— 5 59 1.3	—2.99140
13	13	II. U.	12 39 40.16	2.11900	67.28	— 9 11 5.4	—2.97239
14	14	II. L.	13 6 3.44	2.12212	67.53	—12 13 35.2	—2.94684
14	14	II. U.	13 32 41.77	2.12713	67.94	—15 4 18.8	—2.91415
15	15	II. L.	13 59 41.27	2.13354	68.45	—17 41 12.0	—2.87307
15	15	II. U.	14 27 6.72	2.14070	69.02	—20 2 19.1	—2.82152
16	16	II. L.	14 54 59.83	2.14796	69.60	—22 5 51.6	—2.75657
16	16	II. U.	15 23 20.15	2.15461	70.14	—23 50 10.5	—2.67306
17	17	II. L.	15 52 4.75	2.16011	70.57	—25 13 50.8	—2.56203
17	17	II. U.	16 21 7.48	2.16364	70.83	—26 15 46.0	—2.40486
18	18	II. L.	16 50 20.07	2.16489	70.91	—26 55 12.2	—2.14706
18	18	II. U.	17 19 32.11	2.16343	70.76	—27 11 51.3	—1.42160
19	19	II. L.	17 48 32.88	2.15924	70.35	—27 5 53.6	+1.93202
19	19	II. U.	18 17 11.55	2.15238	69.74	—26 37 58.4	+2.28500
20	20	II. L.	18 45 18.58	2.14317	68.96	—25 49 10.6	+2.46829
20	20	II. U.	19 13 46.50	2.13200	68.05	—24 40 55.5	+2.58779
21	21	II. L.	19 39 29.91	2.11949	67.02	—23 14 55.6	+2.67345
21	21	I. U.	20 3 14.40	2.10626	65.95	—21 33 1.7	+2.73723
22	22	I. L.	20 38 25.64	2.09279	64.91	—19 37 8.6	+2.78619
22	22	I. U.	20 58 51.28	2.07947	63.98	—17 29 10.9	+2.82405
23	23	I. L.	21 16 34.74	2.06718	63.08	—15 10 59.5	+2.83346
24	23	I. U.	21 39 40.92	2.05648	62.24	—12 44 18.7	+2.87612
24	24	I. L.	22 2 15.41	2.04762	61.60	—10 10 46.7	+2.89335
25	24	I. U.	22 24 24.71	2.04084	61.12	— 7 31 55.1	+2.90589
25	25	I. L.	22 46 15.84	2.03611	60.80	— 4 49 8.5	+2.91455
26	25	I. U.	23 7 56.14	2.03391	60.67	— 2 3 47.1	+2.91963
26	26	I. L.	23 29 33.30	2.03427	60.74	+ 0 42 52.9	+2.92145



# 306 MOON CULMINATIONS, 1860.

WASHINGTON MERIDIAN.							
Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Jan. 27	26	I. U.	23 51 15.30	2.03739	61.00	+ 3 29 36.8	+2.92000
27	27	I. L.	0 13 10.41	2.04324	61.44	+ 6 15 9.7	+2.91518
28	28	I. U.	0 35 27.07	2.05169	62.08	+ 8 58 13.5	+2.90674
28	28	I. L.	0 58 13.94	2.06285	62.92	+11 37 24.2	+2.89414
29	29	I. U.	1 21 39.77	2.07628	63.96	+14 11 9.8	+2.87653
29	29	I. L.	1 45 53.23	2.09192	65.17	+16 37 47.4	+2.85254
30	30	I. U.	2 11 3.63	2.10917	66.52	+18 55 19.6	+2.82039
30	30	I. L.	2 7 15.39	2.12756	68.00	+21 1 32.6	+2.77727
31	31	I. U.	3 4 37.43	2.14644	69.55	+22 53 59.3	+2.71879
31	31	I. L.	3 33 12.36	2.16510	71.10	+24 29 53.2	+2.63673
Feb. 1	32	I. U.	4 3 0.37	2.18241	72.56	+25 46 19.5	+2.51658
1	32	I. L.	4 33 57.68	2.19769	73.88	+26 40 21.3	+2.32062
2	33	I. U.	5 5 55.30	2.20973	74.95	+27 9 11.0	+1.88632
2	33	I. L.	5 38 39.75	2.21817	75.68	+27 10 27.5	+1.81684
3	34	I. U.	6 11 53.47	2.22249	76.01	+26 42 32.3	+2.33072
3	34	I. L.	6 45 16.77	2.22207	75.96	+25 44 43.6	+2.56073
4	35	I. U.	7 18 30.20	2.21798	75.55	+24 17 25.1	+2.70611
4	35	I. L.	7 51 16.82	2.21013	74.84	+22 22 7.5	+2.80782
5	36	I. U.	8 23 23.86	2.20008	73.92	+20 1 20.2	+2.88218
5	36	I. L.	8 54 43.28	2.18854	72.90	+17 18 20.1	+2.93668
6	37	II. U.	9 27 36.22	2.17682	71.86	+14 16 56.3	+2.97612
7	37	II. L.	9 57 14.69	2.16521	70.90	+11 1 16.4	+3.00306
7	38	II. U.	10 26 9.42	2.15531	70.06	+ 7 35 32.8	+3.01982
8	38	II. L.	10 54 27.50	2.14681	69.38	+ 4 3 54.4	+3.02785
8	39	II. U.	11 22 17.50	2.14070	68.88	+ 0 30 18.3	+3.02799
9	39	II. L.	11 49 48.59	2.13688	68.59	+ 3 1 31.7	+3.02068
9	40	II. U.	12 17 9.91	2.13551	68.51	+ 6 28 9.6	+3.00639
10	41	II. L.	12 44 30.19	2.13627	68.62	+ 9 46 28.4	+2.98495
10	41	II. U.	13 11 57.14	2.13899	68.87	+12 53 38.6	+2.95600
11	42	II. L.	13 39 37.33	2.14314	69.24	+15 47 7.7	+2.91874
11	42	II. U.	14 7 35.64	2.14832	69.69	+18 24 40.6	+2.87185
12	43	II. L.	14 35 54.80	2.15387	70.15	+20 44 16.7	+2.81298
12	43	II. U.	15 4 35.31	2.15900	70.61	+22 44 12.0	+2.73870
13	44	II. L.	15 33 34.83	2.16331	70.98	+24 23 3.4	+2.64311
13	44	II. U.	16 2 48.86	2.16610	71.22	+25 39 46.5	+2.51429
14	45	II. L.	16 32 10.31	2.16690	71.27	+26 33 39.7	+2.32578
14	45	II. U.	17 1 30.50	2.16540	71.13	+27 4 28.3	+1.98462
15	46	II. L.	17 30 39.71	2.16146	70.76	+27 12 21.3	+1.23198
15	46	II. U.	17 59 28.22	2.15512	70.20	+26 57 54.9	+2.10202
16	47	II. L.	18 27 47.14	2.14660	69.46	+26 22 7.3	+2.36222
16	47	II. U.	18 55 23.18	2.13612	68.58	+25 26 17.7	+2.51407
17	48	II. L.	19 22 29.11	2.12431	67.58	+24 11 57.7	+2.61805
17	48	II. U.	19 48 43.99	2.11170	66.52	+23 40 50.9	+2.69436
18	49	II. L.	20 14 12.91	2.09871	65.46	+20 54 42.2	+2.75224
18	49	II. U.	20 38 57.13	2.08600	64.45	+18 55 18.0	+2.79728
19	50	II. L.	21 2 59.41	2.07390	63.51	+16 44 28.0	+2.83244
19	50	II. U.	21 26 23.77	2.06296	62.66	+14 23 53.7	+2.86000
20	51	II. L.	21 49 15.29	2.05338	61.94	+11 55 13.8	+2.88136
21	51	II. U.	22 11 39.73	2.04563	61.37	+ 9 20 1.5	+2.89755
21	52	I. L.	22 31 41.47	2.04003	60.95	+ 6 39 46.1	+2.90926



# MOON CULMINATIONS, 1860. 307

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Feb. 22	52	I. U.	22 53 31.44	2.03636	60.69	— 3 55 53.3	+2.91702
22	53	I. L.	23 15 13.84	2.03511	60.60	— 1 9 47.1	+2.92109
23	53	I. U.	23 36 55.74	2.03623	60.69	+ 1 37 12.4	+2.92160
23	54	I. L.	23 58 44.58	2.03985	60.98	+ 4 23 43.8	+2.91865
24	55	I. U.	0 20 47.42	2.04602	61.45	+ 7 8 24.4	+2.91186
24	55	I. L.	0 43 12.20	2.05446	62.11	+ 9 49 49.8	+2.90114
25	56	I. U.	1 6 6.49	2.06487	62.92	+12 26 28.4	+2.88570
25	56	I. L.	1 29 37.82	2.07748	63.90	+14 56 44.7	+2.86482
26	57	I. U.	1 53 53.31	2.09181	65.04	+17 18 52.8	+2.83709
26	57	I. L.	2 18 59.79	2.10738	66.29	+19 30 57.9	+2.80064
27	58	I. U.	2 45 3.08	2.12382	67.62	+21 30 55.1	+2.75257
27	58	I. L.	3 12 7.21	2.14045	68.99	+23 16 28.4	+2.68818
28	59	I. U.	3 40 14.21	2.15667	70.36	+24 45 13.8	+2.59943
28	59	I. L.	4 9 23.42	2.17164	71.64	+25 54 43.3	+2.47000
29	60	I. U.	4 39 30.60	2.18466	72.77	+26 42 30.7	+2.25730
29	60	I. L.	5 10 37.90	2.19504	73.68	+27 6 21.9	+1.74920
Mar. 1	61	I. U.	5 42 3.94	2.20230	74.32	+27 4 25.0	—1.88463
1	61	I. L.	6 14 4.91	2.20607	74.65	+26 35 20.5	—2.33135
2	62	I. U.	6 46 15.40	2.20637	74.65	+25 38 32.5	—2.54822
2	62	I. L.	7 18 20.49	2.20344	74.36	+24 14 14.2	—2.68920
3	63	I. U.	7 50 7.04	2.19783	73.83	+22 23 28.7	—2.78044
3	63	I. L.	8 21 25.06	2.19030	73.15	+20 8 5.9	—2.86601
4	64	I. U.	8 52 8.41	2.18172	72.37	+17 30 37.3	—2.92301
4	64	I. L.	9 22 14.80	2.17283	71.56	+14 34 8.4	—2.96577
5	65	I. U.	9 51 45.39	2.16444	70.83	+11 22 8.1	—2.99676
5	65	I. L.	10 20 44.24	2.15731	70.20	+ 7 58 23.2	—3.01769
6	66	I. U.	10 49 17.44	2.15180	69.71	+ 4 26 49.7	—3.02968
7	66	II. L.	11 19 51.36	2.14826	69.40	+ 0 51 25.1	—3.03341
7	67	II. U.	11 47 56.30	2.14687	69.29	— 2 43 53.0	—3.02927
8	68	II. L.	12 15 59.91	2.14759	69.38	— 6 15 14.4	—3.01741
8	68	II. U.	12 44 10.03	2.15014	69.62	— 9 39 0.3	—2.99734
9	69	II. L.	13 12 33.35	2.15427	69.97	—12 51 45.2	—2.96886
9	69	II. U.	13 41 15.16	2.15936	70.44	—15 50 21.2	—2.93082
10	70	II. L.	14 10 18.64	2.16504	70.93	—18 31 58.0	—2.88161
10	70	II. U.	14 39 44.67	2.17047	71.42	—20 54 10.3	—2.81878
11	71	II. L.	15 9 31.30	2.17502	71.85	—22 54 57.7	—2.73843
11	71	II. U.	15 39 33.84	2.17808	72.15	—24 32 47.2	—2.63305
12	72	II. L.	16 9 44.93	2.17906	72.26	—25 46 38.5	—2.48898
12	72	II. U.	16 39 55.25	2.17765	72.16	—26 36 4.5	—2.26912
13	73	II. L.	17 9 54.30	2.17363	71.84	—27 1 6.6	—1.81411
13	73	II. U.	17 39 31.37	2.16699	71.28	—27 2 24.3	+1.70978
14	74	II. L.	18 8 36.63	2.15800	70.47	—26 40 59.9	+2.20847
14	74	II. U.	18 37 2.11	2.14703	69.55	—25 58 17.1	+2.24155
15	75	II. L.	19 4 41.99	2.13453	68.54	—24 55 56.2	+2.53568
15	75	II. U.	19 31 32.91	2.12113	67.44	—23 35 45.1	+2.64578
16	76	II. L.	19 57 33.99	2.10735	66.30	—21 59 35.0	+2.71404
16	76	II. U.	20 22 46.48	2.09374	65.20	—20 9 16.7	+2.76629
17	77	II. L.	20 47 13.36	2.08081	64.17	—18 6 37.9	+2.80704
17	77	II. U.	21 10 58.95	2.06904	63.24	—15 53 19.3	+2.83917
18	78	II. L.	21 34 8.53	2.05866	62.44	—13 30 57.1	+2.86446



# 308 MOON CULMINATIONS; 1860.

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Mar. 18	78	II. U.	21 54 48.12	2.05011	61.77	-11 1 2.5	+2.88418
19	79	II. L.	22 19 4.13	2.04336	61.25	- 8 25 1.9	+2.89924
19	79	II. U.	22 41 3.32	2.03910	60.91	- 5 44 18.5	+2.91015
20	80	II. L.	23 2 52.61	2.03695	60.74	- 3 0 13.5	+2.91726
20	80	II. U.	23 24 39.01	2.03723	60.72	- 0 14 7.5	+2.92077
21	81	II. L.	23 46 29.70	2.03969	60.88	+ 2 32 37.3	+2.92069
22	82	I. U.	0 6 29.40	2.04481	61.24	+ 5 18 37.5	+2.91682
22	82	I. L.	0 28 49.15	2.05196	61.77	+ 8 2 24.5	+2.90892
23	83	I. U.	0 51 34.34	2.06127	62.46	+10 42 26.0	+2.89651
23	83	I. L.	1 14 51.91	2.07247	63.31	+13 17 2.0	+2.87883
24	84	I. U.	1 38 48.48	2.08525	64.30	+15 44 26.5	+2.85487
24	84	I. L.	2 3 30.11	2.09934	65.41	+18 2 45.9	+2.82315
25	85	I. U.	2 29 1.94	2.11414	66.60	+20 9 57.2	+2.78146
25	85	I. L.	2 55 27.71	2.12924	67.84	+22 3 50.5	+2.72634
26	86	I. U.	3 22 49.28	2.14404	69.08	+23 42 12.2	+2.65240
26	86	I. L.	3 51 6.13	2.15785	70.26	+25 2 45.9	+2.54978
27	87	I. U.	4 20 14.93	2.16997	71.34	+26 3 20.3	+2.39672
27	87	I. L.	4 50 9.33	2.17987	72.22	+26 41 54.4	+2.12991
28	88	I. U.	5 20 39.99	2.18710	72.86	+26 55 46.0	+1.10890
28	88	I. L.	5 51 35.28	2.19123	73.24	+26 46 40.5	-2.05847
29	89	I. U.	6 22 42.30	2.19232	73.35	+26 10 55.7	-2.28619
29	89	I. L.	6 53 48.09	2.19050	73.20	+25 9 27.7	-2.56929
30	90	I. U.	7 24 41.01	2.18617	72.83	+23 42 51.0	-2.69393
30	90	I. L.	7 55 11.84	2.18001	72.28	+21 52 16.5	-2.78525
31	91	I. U.	8 25 14.50	2.17272	71.64	+19 39 27.2	-2.85508
31	91	I. L.	8 54 45.77	2.16498	70.95	+17 6 34.7	-2.90868
Apr. 1	92	I. U.	9 23 46.14	2.15752	70.29	+14 16 11.3	-2.94989
1	92	I. L.	9 52 18.64	2.15100	69.71	+11 11 7.5	-2.96080
2	93	I. U.	10 20 28.45	2.14607	69.25	+ 7 54 29.2	-3.00292
2	93	I. L.	10 48 22.29	2.14304	68.96	+ 4 29 32.9	-3.01695
3	94	I. U.	11 16 8.01	2.14211	68.86	+ 0 59 45.0	-3.02335
3	94	I. L.	11 43 53.98	2.14333	68.93	- 2 31 21.2	-3.02332
4	95	I. U.	12 11 48.51	2.14669	69.18	- 6 0 8.1	-3.01369
4	96	I. L.	12 39 59.41	2.15189	69.62	- 9 22 56.0	-2.99690
5	96	II. U.	13 10 53.82	2.15854	70.18	-12 36 8.5	-2.97134
6	97	II. L.	13 39 57.39	2.16601	70.81	-15 36 16.3	-2.93564
6	97	II. U.	14 9 32.10	2.17377	71.48	-18 20 2.1	-2.88799
7	98	II. L.	14 39 37.72	2.18096	72.10	-20 44 28.5	-2.82568
7	98	II. U.	15 10 10.91	2.18682	72.64	-22 47 3.9	-2.74408
8	99	II. L.	15 41 4.81	2.19058	73.03	-24 25 49.4	-2.63513
8	99	II. U.	16 12 9.50	2.19173	73.19	-25 39 25.3	-2.48269
9	100	II. L.	16 43 12.71	2.18988	73.04	-26 27 16.6	-2.24287
9	100	II. U.	17 14 1.29	2.18489	72.84	-26 49 28.2	-1.67934
10	101	II. L.	17 44 22.20	2.17684	71.99	-26 46 47.0	+1.86806
10	101	II. U.	18 14 4.04	2.16610	71.11	-26 20 33.6	+2.27229
11	102	II. L.	18 42 57.92	2.15323	70.04	-25 32 33.6	+2.46434
11	102	II. U.	19 10 58.09	2.13887	68.86	-24 24 47.1	+2.58518
12	103	II. L.	19 38 1.79	2.12369	67.63	-22 59 22.3	+2.66992
12	103	II. U.	20 4 9.39	2.10833	66.39	-21 18 26.0	+2.73245
13	104	II. L.	20 29 23.14	2.09353	65.23	-19 23 59.3	+2.78011



# MOON CULMINATIONS, 1860. 309

## WASHINGTON MERIDIAN.

Moon Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascen- sion for 1 hour of Longitude.	Sidereal Time of Semi- diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Apr. 13	104	II. v.	20 53 47.74	2.07972	64.15	-17 17 56.6	+2.81707
14	105	II. L.	21 17 28.57	2.06733	63.19	-15 2 1.9	+2.84603
14	105	II. v.	21 40 32.40	2.05679	62.38	-12 37 50.2	+2.86875
15	106	II. L.	22 3 6.23	2.04836	61.72	-10 6 48.9	+2.88643
15	106	II. v.	22 25 17.51	2.04226	61.24	-7 30 19.3	+2.89982
16	107	II. L.	22 47 13.81	2.03862	60.94	-4 49 38.6	+2.90944
16	107	II. v.	23 9 2.80	2.03751	60.81	-2 6 1.6	+2.91563
17	108	II. L.	23 30 52.16	2.03878	60.86	+0 39 16.2	+2.91832
17	108	II. v.	23 52 49.68	2.04274	61.12	+3 24 57.7	+2.91756
18	109	II. L.	0 15 2.86	2.04906	61.55	+6 9 39.7	+2.91813
18	110	II. v.	0 37 39.14	2.05775	62.15	+8 51 54.5	+2.90449
19	110	II. L.	1 0 46.34	2.06849	62.94	+11 30 8.1	+2.89106
19	111	II. v.	1 24 31.47	2.08099	63.87	+14 2 35.7	+2.87188
20	111	II. L.	1 49 0.48	2.09486	64.92	+16 27 19.8	+2.84556
21	112	I. v.	2 12 6.98	2.10972	66.07	+18 42 15.5	+2.81049
21	112	I. L.	2 38 16.97	2.12500	67.29	+20 45 10.2	+2.76384
22	113	I. v.	3 5 22.92	2.14004	68.54	+22 33 42.9	+2.70136
22	113	I. L.	3 33 24.75	2.15415	69.73	+24 5 30.2	+2.61606
23	114	I. v.	4 2 19.59	2.16664	70.80	+25 18 13.4	+2.49423
23	114	I. L.	4 32 0.78	2.17690	71.72	+26 9 43.2	+2.30380
24	115	I. v.	5 2 19.44	2.18438	72.40	+26 38 11.8	+1.91561
24	115	I. L.	5 33 3.51	2.18865	72.81	+26 42 18.4	-1.62190
25	116	I. v.	6 3 59.42	2.18966	72.93	+26 21 18.1	-2.26111
25	116	I. L.	6 34 53.47	2.18755	72.78	+25 35 4.5	-2.46773
26	117	I. v.	7 5 33.02	2.18273	72.40	+24 24 11.1	-2.61759
26	117	I. L.	7 35 47.97	2.17577	71.81	+22 49 46.1	-2.72301
27	118	I. v.	8 5 31.12	2.16741	71.12	+20 53 28.3	-2.80129
27	118	I. L.	8 34 38.88	2.15842	70.40	+18 37 19.0	-2.86129
28	119	I. v.	9 3 11.03	2.14962	69.63	+16 3 36.7	-2.90762
28	119	I. L.	9 31 10.17	2.14170	68.96	+13 14 49.2	-2.94315
29	120	I. v.	9 58 41.29	2.13523	68.40	+10 13 34.8	-2.96977
29	120	I. L.	10 25 51.23	2.13069	68.01	+7 2 35.7	-2.98884
30	121	I. v.	10 52 48.04	2.12843	67.79	+3 44 40.0	-3.00095
30	121	I. L.	11 19 40.55	2.12862	67.76	+0 22 41.5	-3.00645
May 1	122	I. v.	11 46 37.94	2.13124	67.95	-3 0 19.9	-3.00540
1	123	I. L.	12 13 49.25	2.13621	68.33	-6 21 17.9	-2.99752
2	123	I. v.	12 41 23.05	2.14327	68.87	-9 37 0.0	-2.98218
2	124	I. L.	13 9 26.76	2.15183	69.55	-12 44 8.3	-2.95842
3	124	I. v.	13 38 6.22	2.16149	70.33	-15 39 24.1	-2.92488
4	125	I. L.	14 7 24.86	2.17134	71.16	-18 19 31.2	-2.87935
4	125	I. v.	14 37 23.22	2.18064	71.96	-20 41 23.3	-2.81878
5	126	II. L.	15 10 23.41	2.18854	72.64	-22 42 12.6	-2.73824
5	126	II. v.	15 41 38.80	2.19427	73.13	-24 19 39.6	-2.63909
6	127	II. L.	16 12 52.57	2.19706	73.41	-25 32 1.2	-2.47298
6	127	II. v.	16 44 20.90	2.19629	73.37	-26 18 20.7	-2.21998
7	128	II. L.	17 15 38.57	2.19201	73.03	-26 38 29.4	-1.55727
7	128	II. v.	17 46 30.32	2.18424	72.39	-26 33 6.4	+1.94792
8	129	II. L.	18 16 42.66	2.17336	71.50	-26 3 31.4	+2.31258
8	129	II. v.	18 46 4.93	2.15996	70.42	-25 11 36.4	+2.49391
9	130	II. L.	19 14 30.08	2.14492	69.20	-23 59 33.1	+2.80934



# 310 MOON CULMINATIONS, 1860.

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
May 9	130	II. v.	19 41 54.74	2.12875	67.90	-22 29 42.7	+2.69000
10	131	II. L.	20 8 18.81	2.11241	66.62	-20 44 26.0	+2.74912
10	131	II. v.	20 33 44.96	2.09656	65.39	-18 45 57.4	+2.79365
11	132	II. L.	20 58 18.09	2.08175	64.27	-16 36 20.8	+2.82776
11	132	II. v.	21 22 4.38	2.06856	63.28	-14 17 28.5	+2.85410
12	133	II. L.	21 45 11.00	2.05740	62.43	-11 51 0.5	+2.87435
12	133	II. v.	22 7 45.73	2.04840	61.76	-9 18 26.6	+2.88973
13	134	II. L.	22 29 56.75	2.04199	61.28	-6 41 7.5	+2.90111
13	134	II. v.	22 51 52.28	2.03830	60.99	-4 0 18.2	+2.90895
14	135	II. L.	23 13 40.71	2.03735	60.89	-1 17 9.7	+2.91361
14	135	II. v.	23 35 30.38	2.03910	60.99	+1 27 7.7	+2.91506
15	136	II. L.	23 57 29.65	2.04364	61.28	+4 11 21.6	+2.91327
15	137	II. v.	0 19 46.90	2.05085	61.77	+6 54 15.4	+2.90784
16	137	II. L.	0 42 30.33	2.06047	62.45	+9 34 25.6	+2.89842
16	138	II. v.	1 5 47.97	2.07232	63.29	+12 10 19.2	+2.88418
17	138	II. L.	1 29 47.53	2.08604	64.29	+14 40 11.9	+2.86399
17	139	II. v.	1 54 36.02	2.10126	65.44	+17 2 7.0	+2.83638
18	139	II. L.	2 20 19.35	2.11737	66.69	+19 13 53.6	+2.79912
18	140	II. v.	2 47 1.75	2.13376	67.98	+21 13 10.7	+2.74895
19	140	II. L.	3 14 45.22	2.14970	69.27	+23 57 26.1	+2.68060
19	141	II. v.	3 43 28.80	2.16447	70.50	+24 24 5.1	+2.56542
20	141	I. L.	4 10 44.73	2.17716	71.59	+25 30 36.9	+2.44454
21	142	I. v.	4 41 9.31	2.18713	72.47	+26 14 45.1	+2.30777
21	142	I. L.	5 12 9.70	2.19371	73.07	+26 34 38.6	+1.56253
22	143	I. v.	5 43 31.43	2.19665	73.35	+26 29 3.6	-1.96703
22	143	I. L.	6 14 58.49	2.19587	73.32	+25 57 29.3	-2.24780
23	144	I. v.	6 46 15.33	2.19173	72.98	+25 0 13.3	-2.54291
23	144	I. L.	7 17 8.34	2.18469	72.40	+23 38 16.4	-2.67104
24	145	I. v.	7 47 27.07	2.17545	71.66	+21 53 20.1	-2.76245
24	145	I. L.	8 17 5.03	2.16501	70.80	+19 47 33.9	-2.89051
25	146	I. v.	8 45 59.68	2.15390	69.91	+17 23 27.1	-2.88197
25	146	I. L.	9 14 11.98	2.14358	69.06	+14 43 40.0	-2.92095
26	147	I. v.	9 41 45.96	2.18440	68.31	+11 50 57.3	-2.94998
26	147	I. L.	10 8 47.85	2.12694	67.71	+8 48 4.0	-2.97094
27	148	I. v.	10 35 25.50	2.12159	67.28	+5 37 43.0	-2.98490
27	148	I. L.	11 1 47.85	2.11880	67.05	+2 22 36.1	-2.99257
28	149	I. v.	11 28 4.41	2.11870	67.02	-0 54 36.7	-2.99420
28	149	I. L.	11 54 24.86	2.12120	67.20	-4 11 14.5	-2.98997
29	150	I. v.	12 20 58.78	2.12623	67.57	-7 24 34.0	-2.97944
29	151	I. L.	12 47 55.21	2.13341	68.18	-10 31 49.3	-2.96207
30	151	I. v.	13 15 21.87	2.14242	68.83	-13 30 9.1	-2.93678
30	152	I. L.	13 43 25.25	2.15259	69.63	-16 16 40.4	-2.90208
31	152	I. v.	14 12 9.65	2.16319	70.51	-18 48 28.7	-2.85583
31	153	I. L.	14 41 36.34	2.17345	71.33	-21 2 44.7	-2.79446
June 1	153	I. v.	15 11 43.08	2.18238	72.07	-22 56 50.4	-2.71260
1	154	I. L.	15 42 23.76	2.18929	72.65	-24 28 28.7	-2.60079
2	154	I. v.	16 13 28.45	2.19337	73.00	-25 35 52.5	-2.43796
2	155	II. L.	16 47 10.07	2.19399	73.07	-26 17 54.8	-2.16373
3	155	II. v.	17 18 20.68	2.19100	72.83	-26 34 14.3	-1.34699
4	156	II. L.	17 49 10.53	2.18432	72.24	-26 25 17.1	+2.02702



# MOON CULMINATIONS, 1860. 311

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Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
June 4	156	II. U.	18 19 25.39	2.17438	71.41	—25 52 11.8	+2.34838
5	157	II. L.	18 48 53.45	2.16173	70.37	—24 56 43.3	+2.51825
5	157	II. U.	19 17 26.55	2.14712	69.19	—23 41 0.6	+2.62865
6	158	II. L.	19 45 0.18	2.13111	67.93	—22 7 26.0	+2.70623
6	158	II. U.	20 11 33.40	2.11491	66.66	—20 18 24.9	+2.76322
7	159	II. L.	20 37 8.18	2.09892	65.42	—18 16 18.5	+2.80587
7	159	II. U.	21 1 48.86	2.08382	64.30	—16 3 18.7	+2.83809
8	160	II. L.	21 25 41.34	2.07026	63.31	—13 41 24.7	+2.86251
8	160	II. U.	21 48 52.63	2.05862	62.45	—11 12 24.2	+2.88086
9	161	II. L.	22 11 30.50	2.04918	61.78	— 8 37 52.3	+2.89433
9	161	II. U.	22 33 43.12	2.04234	61.28	— 6 59 13.9	+2.90378
10	162	II. L.	22 55 38.91	2.03814	60.99	— 3 17 46.5	+2.90970
10	162	II. U.	23 17 26.37	2.03683	60.90	— 0 34 41.6	+2.91251
11	163	II. L.	23 39 14.07	2.03834	60.99	+ 2 8 52.2	+2.91226
11	164	II. U.	0 1 10.70	2.04274	61.30	+ 4 51 45.5	+2.90893
12	164	II. L.	0 23 24.96	2.04984	61.80	+ 7 32 46.1	+2.90211
12	165	II. U.	0 46 5.48	2.05960	62.49	+10 10 36.0	+2.89147
13	165	II. L.	1 9 20.83	2.07173	63.37	+12 45 48.2	+2.87613
13	166	II. U.	1 33 19.29	2.08593	64.42	+15 10 44.8	+2.85493
14	166	II. L.	1 58 8.48	2.10175	65.61	+17 29 32.8	+2.82624
14	167	II. U.	2 23 55.13	2.11867	66.92	+19 28 6.9	+2.78777
15	167	II. L.	2 50 44.37	2.13612	68.29	+21 34 6.2	+2.73575
15	168	II. U.	3 18 38.92	2.15314	69.68	+23 14 56.9	+2.66466
16	168	II. L.	3 47 38.42	2.16900	70.99	+24 37 58.3	+2.56364
16	169	II. U.	4 17 38.73	2.18290	72.16	+25 40 30.7	+2.41037
17	169	II. L.	4 48 31.38	2.19390	73.11	+26 20 5.8	+2.13646
17	170	II. U.	5 20 3.96	2.20129	73.74	+26 34 41.0	+0.89265
18	170	II. L.	5 52 0.61	2.20477	74.04	+26 22 51.7	+2.10189
19	171	I. U.	6 21 35.86	2.20428	74.00	+25 44 3.1	—2.41756
19	171	I. L.	6 53 29.20	2.20006	73.62	+24 38 33.2	—2.59385
20	172	I. U.	7 24 57.22	2.19257	72.99	+23 7 34.1	—2.71242
20	172	I. L.	7 55 48.23	2.18278	72.18	+21 13 3.2	—2.79749
21	173	I. U.	8 25 54.85	2.17152	71.34	+18 57 32.1	—2.86043
21	173	I. L.	8 55 14.02	2.15975	70.28	+16 23 56.5	—2.90740
22	174	I. U.	9 23 46.68	2.14841	69.35	+13 35 23.6	—2.94193
22	174	I. L.	9 51 36.88	2.13821	68.55	+10 35 3.3	—2.96659
23	175	I. U.	10 18 51.19	2.12975	67.90	+ 7 26 2.6	—2.98300
23	175	I. L.	10 45 37.73	2.12355	67.41	+ 4 11 22.6	—2.99239
24	176	I. U.	11 12 5.62	2.11992	67.12	+ 0 53 56.6	—2.99537
24	176	I. L.	11 38 24.50	2.11886	67.05	— 2 23 28.7	—2.99235
25	177	I. U.	12 4 44.13	2.12047	67.18	— 5 38 12.1	—2.98338
25	178	I. L.	12 31 13.96	2.12460	67.50	— 8 47 36.8	—2.96823
26	178	I. U.	12 58 2.75	2.13095	68.00	—11 49 7.9	—2.94626
26	179	I. L.	13 25 18.28	2.13893	68.63	—14 40 11.8	—2.91639
27	179	I. U.	13 53 6.65	2.14808	69.37	—17 18 15.7	—2.87717
27	180	I. L.	14 21 31.93	2.15779	70.15	—19 40 49.5	—2.82612
28	180	I. U.	14 50 35.40	2.16726	70.91	—21 45 28.9	—2.75930
28	181	I. L.	15 20 15.16	2.17551	71.59	—23 30 0.1	—2.67104
29	181	I. U.	15 50 25.80	2.18187	72.11	—24 52 27.7	—2.54957
29	182	I. L.	16 20 59.40	2.18566	72.41	—25 51 22.2	—2.36901



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Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
June 30	182	I. v.	16 51 41.05	2.18633	72.46	—26 25 47.8	—2.04210
30	183	I. L.	17 22 20.08	2.18364	72.20	—26 35 27.1	+1.12352
July 1	183	I. v.	17 52 41.25	2.17762	71.68	—26 20 44.2	+2.12355
1	184	I. L.	18 22 31.18	2.16847	70.91	—25 42 42.1	+2.39101
2	184	II. v.	18 53 58.67	2.15673	69.91	—24 42 55.5	+2.54407
3	185	II. L.	19 22 13.77	2.14301	68.78	—23 23 24.7	+2.64658
3	185	II. v.	19 49 33.64	2.12808	67.55	—21 46 33.0	+2.72020
4	186	II. L.	20 15 56.99	2.11264	66.24	—19 54 10.6	+2.77457
4	186	II. v.	20 41 25.14	2.09740	65.18	—17 49 5.6	+2.81552
5	187	II. L.	21 6 1.73	2.08290	64.10	—15 33 18.6	+2.84641
5	187	II. v.	21 29 51.99	2.06978	63.12	—13 8 52.1	+2.86960
6	188	II. L.	21 53 2.36	2.05843	62.31	—10 37 37.7	+2.88670
6	188	II. v.	22 15 39.95	2.04914	61.67	—8 1 14.7	+2.89887
7	189	II. L.	22 37 52.42	2.04226	61.18	—5 21 12.9	+2.90681
7	189	II. v.	22 59 47.71	2.03786	60.89	—2 38 54.7	+2.91123
8	190	II. L.	23 21 33.96	2.03639	60.80	+0 4 24.1	+2.91233
8	190	II. v.	23 43 19.45	2.03755	60.91	+2 47 33.0	+2.91019
9	191	II. L.	0 5 12.48	2.04123	61.19	+5 29 22.6	+2.90511
9	192	II. v.	0 27 21.56	2.04789	61.66	+8 8 39.3	+2.89651
10	192	II. L.	0 49 55.01	2.05706	62.36	+10 44 8.2	+2.88406
10	193	II. v.	1 13 1.40	2.06871	63.22	+13 14 27.7	+2.86703
11	193	II. L.	1 36 48.95	2.08243	64.25	+15 38 6.1	+2.84431
11	194	II. v.	2 1 25.42	2.09792	65.43	+17 53 19.8	+2.81424
12	194	II. L.	2 26 57.77	2.11458	66.72	+19 58 12.1	+2.77441
12	195	II. v.	2 53 31.65	2.13188	68.10	+21 50 31.7	+2.72129
13	195	II. L.	3 21 10.56	2.14919	69.49	+23 27 54.7	+2.64861
13	196	II. v.	3 49 55.33	2.16563	70.83	+24 47 46.9	+2.54553
14	196	II. L.	4 19 43.21	2.18027	72.07	+25 47 32.0	+2.38759
14	197	II. v.	4 50 27.28	2.19243	73.09	+26 24 39.8	+2.09746
15	197	II. L.	5 21 56.63	2.20126	73.84	+26 36 59.7	—0.54407
15	198	II. v.	5 53 56.66	2.20637	74.26	+26 22 53.8	—0.14073
16	198	II. L.	6 26 10.71	2.20753	74.36	+25 41 28.9	—0.44018
16	199	II. v.	6 58 21.43	2.20496	74.10	+24 32 47.3	—0.61318
17	199	II. L.	7 30 13.26	2.19910	73.58	+22 57 43.8	—0.73113
18	200	I. v.	7 59 7.73	2.19064	72.86	+20 58 7.9	—0.81652
18	200	I. L.	8 29 49.58	2.18050	71.99	+18 36 30.9	—0.87978
19	201	I. v.	8 59 47.35	2.16964	71.05	+15 55 56.5	—0.92574
19	201	I. L.	9 29 0.64	2.15891	70.16	+12 59 46.6	—0.96069
20	202	I. v.	9 57 32.52	2.14916	69.37	+9 51 32.9	—0.98465
20	202	I. L.	10 25 28.83	2.14088	68.72	+6 34 49.3	—0.99959
21	203	I. v.	10 52 56.96	2.13466	68.23	+3 13 4.4	—0.00676
21	203	I. L.	11 20 5.59	2.13072	67.94	—0 10 22.2	—0.00691
22	204	I. v.	11 47 3.83	2.12931	67.85	—3 32 19.9	—0.00045
22	205	I. L.	12 14 0.86	2.13030	67.94	—6 49 49.3	—0.98743
23	205	I. v.	12 41 5.51	2.13351	68.23	—10 0 0.9	—0.96759
23	206	I. L.	13 8 25.81	2.13868	68.67	—13 0 12.8	—0.94032
24	206	I. v.	13 36 8.57	2.14505	69.22	—15 47 51.9	—0.90463
24	207	I. L.	14 4 18.85	2.15293	69.85	—18 20 33.9	—0.85874
25	207	I. v.	14 32 59.56	2.16074	70.49	—20 36 2.6	—0.80003
25	208	I. L.	15 2 10.96	2.16811	71.10	—22 32 14.5	—0.72405



# MOON, CULMINATIONS, 1860. 313

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
July 26	208	I. u.	15 31 50.21	2.17429	71.61	—24 7 21.2	—2.62353
26	209	I. L.	16 1 51.49	2.17852	71.96	—25 19 55.2	—2.48347
27	209	I. u.	16 32 6.02	2.18035	72.09	—26 8 56.1	—2.26762
27	210	I. L.	17 2 22.93	2.17935	71.97	—26 33 53.2	—1.80895
28	210	I. u.	17 38 30.02	2.17539	71.60	—26 34 50.8	+1.73528
28	211	I. L.	18 2 15.13	2.16853	71.00	—26 12 26.4	+2.22737
29	211	I. u.	18 31 27.34	2.15900	70.17	—25 27 49.5	+2.44105
29	212	I. L.	18 59 57.72	2.14743	69.17	—24 22 36.1	+2.57363
30	212	I. u.	19 27 40.05	2.13428	68.07	—22 58 38.6	+2.66584
30	213	I. L.	19 54 30.87	2.12011	66.91	—21 18 0.7	+2.73336
31	213	I. u.	20 20 29.66	2.10575	65.76	—19 22 53.5	+2.78411
Aug. 1	214	I. L.	20 45 37.76	2.09160	64.67	—17 15 24.5	+2.82275
1	214	II. u.	21 12 6.16	2.07828	63.67	—14 57 37.5	+2.85207
2	215	II. L.	21 35 43.11	2.06629	62.77	—12 31 29.8	+2.87417
2	215	II. u.	21 58 44.01	2.05591	62.08	— 9 58 49.6	+2.89035
3	216	II. L.	22 21 15.27	2.04754	61.41	— 7 21 17.3	+2.90162
3	216	II. u.	22 43 24.05	2.04135	60.98	— 4 40 24.3	+2.90868
4	217	II. L.	23 5 17.53	2.03755	60.72	— 1 57 36.2	+2.91199
4	217	II. u.	23 27 3.12	2.03619	60.65	+ 0 45 46.9	+2.91184
5	218	II. L.	23 46 48.49	2.03735	60.77	+ 3 28 29.0	+2.90832
5	219	II. u.	0 10 41.25	2.04112	61.07	+ 6 9 15.5	+2.90145
6	219	II. L.	0 32 49.11	2.04731	61.55	+ 8 46 52.1	+2.89096
6	220	II. u.	0 55 19.84	2.05587	62.20	+11 20 0.7	+2.87643
7	220	II. L.	1 18 21.09	2.06666	63.03	+13 47 20.2	+2.85709
7	221	II. u.	1 42 0.29	2.07943	64.01	+16 7 21.3	+2.83198
8	221	II. L.	2 6 24.64	2.09374	65.12	+18 18 26.6	+2.79942
8	222	II. u.	2 31 40.30	2.10924	66.33	+20 18 47.9	+2.75717
9	222	II. L.	2 57 52.52	2.12542	67.63	+22 6 26.8	+2.70152
9	223	II. u.	3 25 4.61	2.14161	68.94	+23 39 13.8	+2.62624
10	223	II. L.	3 53 17.72	2.15715	70.28	+24 54 51.7	+2.52026
10	224	II. u.	4 22 29.88	2.17131	71.41	+25 51 0.5	+2.35809
11	224	II. L.	4 52 35.82	2.18330	72.43	+26 25 24.2	+2.05717
11	225	II. u.	5 23 26.71	2.19251	73.21	+26 36 1.0	—0.97128
12	225	II. L.	5 54 50.63	2.19863	73.71	+26 21 13.8	—2.14421
12	226	II. u.	6 26 33.67	2.20134	73.92	+25 40 1.7	—2.43590
13	226	II. L.	6 58 20.98	2.20063	73.85	+24 32 7.4	—2.60837
13	227	II. u.	7 29 58.66	2.19700	73.50	+22 58 2.9	—2.72744
14	227	II. L.	8 1 15.04	2.19086	72.93	+20 59 8.7	—2.81526
14	228	II. u.	8 32 1.81	2.18315	72.34	+18 37 29.7	—2.88127
15	228	II. L.	9 2 14.26	2.17476	71.49	+15 55 47.6	—2.93111
15	229	II. u.	9 31 51.41	2.16631	70.78	+12 57 13.7	—2.96812
16	229	I. L.	9 58 35.09	2.15851	70.13	+ 9 45 18.8	—2.99423
17	230	I. u.	10 27 11.57	2.15207	69.59	+ 6 23 44.6	—3.01100
17	230	I. L.	10 55 25.74	2.14740	69.21	+ 2 56 17.8	—3.01932
18	231	I. u.	11 23 25.13	2.14470	69.01	— 0 33 16.1	—3.01990
18	231	I. L.	11 51 17.96	2.14417	68.99	— 4 1 16.7	—3.01294
19	232	I. u.	12 19 12.45	2.14573	69.12	— 7 24 12.9	—2.99841
19	233	I. L.	12 47 16.28	2.14913	69.43	—10 38 44.4	—2.97603
20	233	I. u.	13 15 36.16	2.15409	69.88	—13 41 44.1	—2.94514
20	234	I. L.	13 44 17.46	2.16002	70.40	—16 30 19.1	—2.90438



# 314 MOON CULMINATIONS, 1860.

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Aug. 21	234	I. v.	14 13 23.30	2.16630	70.96	—19 1 53.1	—2.85208
21	235	I. L.	14 42 54.70	2.17240	71.50	—21 14 8.8	—2.78501
22	235	I. v.	15 12 49.75	2.17760	71.96	—23 5 9.2	—2.69822
22	236	I. L.	15 43 3.61	2.18124	72.28	—24 33 22.6	—2.58222
23	236	I. v.	16 13 28.75	2.18273	72.41	—25 37 46.3	—2.41719
23	237	I. L.	16 43 55.50	2.18170	72.31	—26 17 48.6	—2.14323
24	237	I. v.	17 14 12.75	2.17797	71.97	—26 33 30.6	—1.26316
24	238	I. L.	17 44 9.20	2.17149	71.40	—26 25 26.5	+1.99233
25	238	I. v.	18 13 34.39	2.16244	70.62	—25 54 39.9	+2.31896
25	239	I. L.	18 42 19.61	2.15131	69.66	—25 2 37.5	+2.49219
26	239	I. v.	19 10 18.52	2.13878	68.60	—23 51 5.1	+2.60566
26	240	I. L.	19 37 27.43	2.12519	67.45	—22 21 59.3	+2.68671
27	240	I. v.	20 3 45.07	2.11118	66.29	—20 37 21.5	+2.74710
27	241	I. L.	20 29 12.53	2.09723	65.17	—18 39 14.0	+2.79311
28	241	I. v.	20 53 52.63	2.08393	64.12	—16 29 35.8	+2.82848
28	242	I. L.	21 17 49.63	2.07170	63.17	—14 10 20.8	+2.85565
29	242	I. v.	21 41 8.80	2.06092	62.36	—11 43 16.3	+2.87629
29	243	I. L.	22 3 56.19	2.05192	61.68	—9 10 3.0	+2.89142
30	243	II. v.	22 28 20.43	2.04485	61.15	—6 32 16.0	+2.90191
31	244	II. L.	22 50 22.94	2.03993	60.78	—3 51 24.5	+2.90816
31	244	II. v.	23 19 13.96	2.03723	60.61	—1 8 53.3	+2.91065
Sept. 1	245	II. L.	23 34 0.43	2.03695	60.59	+1 33 56.1	+2.90985
1	245	II. v.	23 55 49.30	2.03890	60.74	+4 15 43.5	+2.90537
2	246	II. L.	0 17 47.61	2.04317	61.05	+6 55 9.7	+2.89716
2	247	II. v.	0 40 2.35	2.04965	61.55	+9 30 54.9	+2.88492
3	247	II. L.	1 2 40.32	2.05813	62.30	+12 1 35.8	+2.86827
3	248	II. v.	1 25 48.18	2.06849	63.00	+14 25 46.5	+2.84639
4	248	II. L.	1 49 32.25	2.08041	63.94	+16 41 55.2	+2.81821
4	249	II. v.	2 13 58.32	2.09367	64.99	+18 48 24.2	+2.78202
5	249	II. L.	2 39 11.24	2.10772	66.10	+20 43 28.9	+2.73545
5	250	II. v.	3 5 14.76	2.12212	67.97	+22 25 18.1	+2.67461
6	250	II. L.	3 32 10.97	2.13637	68.45	+23 51 55.1	+2.59298
6	251	II. v.	3 59 59.74	2.14986	69.58	+25 1 20.0	+2.47834
7	251	II. L.	4 28 38.61	2.16197	70.60	+25 51 34.6	+2.30090
7	252	II. v.	4 58 2.42	2.17217	71.48	+26 20 46.6	+1.95679
8	252	II. L.	5 28 3.35	2.18001	72.15	+26 27 18.4	—1.42012
8	253	II. v.	5 58 31.56	2.18520	72.59	+26 9 52.9	—2.17182
9	253	II. L.	6 29 15.76	2.18760	72.79	+25 27 41.9	—2.43672
9	254	II. v.	7 0 4.42	2.18735	72.76	+24 20 30.7	—2.59997
10	254	II. L.	7 30 46.93	2.18475	72.50	+22 48 41.6	—2.71549
10	255	II. v.	8 1 14.59	2.18038	72.09	+20 53 14.5	—2.80198
11	255	II. L.	8 31 21.27	2.17487	71.59	+18 35 45.4	—2.86873
11	256	II. v.	9 1 3.75	2.16879	71.04	+15 58 22.1	—2.92037
12	256	II. L.	9 30 21.77	2.16298	70.50	+13 3 41.4	—2.95984
12	257	II. v.	9 59 17.68	2.15794	70.04	+9 54 43.6	—2.98905
13	257	II. L.	10 27 56.03	2.15421	69.71	+6 34 47.9	—3.00911
13	258	II. v.	10 56 22.83	2.15214	69.53	+3 7 29.1	—3.02072
14	258	I. L.	11 22 26.30	2.15201	69.50	—0 23 27.9	—3.02426
15	259	I. v.	11 50 51.72	2.15381	69.65	—3 54 12.1	—3.01978
15	260	I. L.	12 19 27.61	2.15746	69.96	—7 20 50.9	—3.00713



# MOON CULMINATIONS, 1860. 315

## WASHINGTON MERIDIAN.

Moon Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascen- sion for 1 hour of Longitude.	Sidereal Time of Semi- diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d		h. m. s.		s.	° ' "	
Sept. 16	260	I. U.	12 48 20.94	2.16262	70.41	—10 39 34.3	—2.98567
16	261	I. L.	13 17 37.35	2.16894	70.98	—13 46 41.8	—2.95460
17	261	I. U.	13 47 20.73	2.17580	71.60	—16 38 45.2	—2.91234
17	262	I. L.	14 17 32.54	2.18253	72.18	—19 12 37.5	—2.85681
18	262	I. U.	14 48 11.18	2.18837	72.71	—21 25 35.2	—2.78436
18	263	I. L.	15 19 11.99	2.19271	73.14	—23 15 27.4	—2.68897
19	263	I. U.	15 50 27.10	2.19479	73.37	—24 40 38.9	—2.55919
19	264	I. L.	16 21 46.12	2.19421	73.55	—25 40 15.3	—2.36820
20	264	I. U.	16 52 56.90	2.19068	73.07	—26 14 4.5	—2.02164
20	265	I. L.	17 23 46.77	2.18421	72.52	—26 22 33.8	+1.28353
21	265	I. U.	17 54 3.93	2.17499	71.72	—26 6 47.8	+2.13691
21	266	I. L.	18 23 38.37	2.16343	70.74	—25 28 18.8	+2.39148
22	266	I. U.	18 52 22.73	2.15070	69.62	—24 29 0.1	+2.53822
22	267	I. L.	19 20 12.68	2.13558	68.40	—23 10 56.2	+2.63702
23	267	I. U.	19 47 6.64	2.12047	67.16	—21 36 16.8	+2.70853
23	268	I. L.	20 13 5.60	2.10548	65.94	—19 47 9.7	+2.76211
24	268	I. U.	20 38 12.58	2.09114	64.79	—17 45 37.4	+2.80311
24	269	I. L.	21 2 32.13	2.07791	63.75	—15 33 24.8	+2.83466
25	269	I. U.	21 26 9.89	2.06610	62.83	—13 12 48.9	+2.85902
25	270	I. L.	21 49 12.20	2.05606	62.04	—10 44 59.2	+2.87748
26	270	I. U.	22 11 45.76	2.04809	61.43	— 8 11 38.2	+2.89103
26	271	I. L.	22 33 57.59	2.04236	60.96	— 5 34 12.5	+2.90039
27	271	I. U.	22 55 54.66	2.03862	60.66	— 2 54 4.7	+2.90586
27	272	I. L.	23 17 44.00	2.03735	60.57	— 0 12 35.5	+2.90775
28	272	I. U.	23 39 32.68	2.03838	60.61	+ 2 28 55.6	+2.90606
28	273	I. L.	0 1 27.54	2.04167	60.84	+ 5 9 9.2	+2.90073
29	274	II. U.	0 25 37.85	2.04712	61.23	+ 7 46 43.7	+2.89150
30	274	II. L.	0 48 6.31	2.05453	61.76	+10 20 14.2	+2.87789
30	275	II. U.	1 11 0.97	2.06378	62.44	+12 48 12.5	+2.85938
Oct. 1	275	II. L.	1 34 27.74	2.07454	63.25	+15 9 5.5	+2.83501
1	276	II. U.	1 58 31.87	2.08647	64.18	+17 21 14.5	+2.80355
2	276	II. L.	2 23 17.84	2.09927	65.20	+19 22 56.1	+2.76293
2	277	II. U.	2 48 49.03	2.11241	66.26	+21 12 22.4	+2.71049
3	277	II. L.	3 15 7.02	2.12542	67.32	+22 47 40.9	+2.64151
3	278	II. U.	3 42 12.10	2.13780	68.35	+24 7 0.8	+2.54840
4	278	II. L.	4 10 2.01	2.14897	69.31	+25 8 33.0	+2.41552
4	279	II. U.	4 38 32.31	2.15843	70.15	+25 50 36.1	+2.20140
5	279	II. L.	5 7 36.43	2.16593	70.82	+26 11 41.4	+1.70706
5	280	II. U.	5 37 5.94	2.17102	71.27	+26 10 39.5	—1.79190
6	280	II. L.	6 6 51.22	2.17363	71.52	+25 46 42.6	—2.25020
6	281	II. U.	6 36 42.32	2.17386	71.56	+24 59 29.9	—2.46864
7	281	II. L.	7 6 29.88	2.17202	71.40	+23 49 10.5	—2.61137
7	282	II. U.	7 36 6.07	2.16841	71.09	+22 16 20.0	—2.71509
8	282	II. L.	8 5 25.12	2.16367	70.68	+20 22 1.2	—2.79451
8	283	II. U.	8 34 23.89	2.15845	70.23	+18 7 42.5	—2.85654
9	283	II. L.	9 3 1.69	2.15326	69.76	+15 35 12.4	—2.90555
9	284	II. U.	9 31 30.34	2.14876	69.36	+12 46 39.7	—2.94397
10	284	II. L.	9 59 23.75	2.14548	69.06	+ 9 44 30.6	—2.97332
10	285	II. U.	10 27 17.54	2.14386	68.88	+ 6 31 28.4	—2.99454
11	285	II. L.	10 55 8.60	2.14414	68.86	+ 3 10 32.1	—3.00817



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Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
Oct. 11	286	II. v.	h. m. s. 11 23 4.75	2.14650	69.02	— 0 15 3.8	—3.01433
12	286	II. L.	11 51 14.07	2.15088	69.36	— 3 41 50.4	—3.01311
12	287	II. v.	12 19 44.54	2.15727	69.86	— 7 6 6.8	—3.00384
13	288	II. L.	12 48 43.42	2.16515	70.51	—10 24 3.5	—2.98560
13	288	I. v.	13 15 54.06	2.17406	71.27	—13 31 46.8	—2.95743
14	289	I. L.	13 46 3.60	2.18335	72.08	—16 25 26.8	—2.91758
15	289	I. v.	14 16 52.05	2.19235	72.85	—19 1 24.4	—2.86327
15	290	I. L.	14 48 16.72	2.20008	73.52	—21 16 21.8	—2.79070
16	290	I. v.	15 20 11.01	2.20568	74.04	—23 7 34.2	—2.69266
16	291	I. L.	15 52 24.42	2.20841	74.37	—24 32 58.9	—2.55641
17	291	I. v.	16 24 43.38	2.20777	74.38	—25 31 24.2	—2.24953
17	292	I. L.	16 56 52.30	2.20358	74.04	—26 2 32.6	—1.94537
18	292	I. v.	17 28 35.63	2.19587	73.39	—26 6 59.0	+1.62921
18	293	I. L.	17 59 38.73	2.18498	72.46	—25 46 4.1	+2.21730
19	293	I. v.	18 29 50.44	2.17140	71.35	—25 1 43.8	+2.44170
19	294	I. L.	18 59 2.96	2.15600	70.07	—23 56 16.5	+2.57513
20	294	I. v.	19 27 12.26	2.13953	68.72	—22 32 10.6	+2.66555
20	295	I. L.	19 54 17.82	2.12264	67.34	—20 51 55.1	+2.73056
21	295	I. v.	20 20 22.00	2.10616	66.03	—18 57 52.6	+2.77883
21	296	I. L.	20 45 29.29	2.09065	64.81	—16 52 15.6	+2.81529
22	296	I. v.	21 9 45.71	2.07650	63.71	—14 37 3.8	+2.84309
22	297	I. L.	21 33 18.22	2.06423	62.77	—12 14 4.7	+2.86426
23	297	I. v.	21 56 14.37	2.05400	61.99	— 9 44 55.1	+2.88011
23	298	I. L.	22 18 41.95	2.04626	61.39	— 7 11 2.8	+2.89149
24	298	I. v.	22 40 48.86	2.04088	60.95	— 4 33 48.1	+2.89902
24	299	I. L.	23 2 42.88	2.03806	60.70	— 1 54 27.4	+2.90306
25	299	I. v.	23 24 31.67	2.03766	60.64	+ 0 45 45.4	+2.90374
25	300	I. L.	23 46 22.82	2.03981	60.75	+ 3 25 36.4	+2.90105
26	300	I. v.	0 8 23.75	2.04435	61.05	+ 6 3 50.0	+2.89481
26	301	I. L.	0 30 41.61	2.05104	61.49	+ 8 39 6.6	+2.88469
27	302	I. v.	0 53 23.20	2.05979	62.10	+11 10 1.5	+2.86998
27	302	I. L.	1 16 34.99	2.07015	62.86	+13 35 3.9	+2.84998
28	303	I. v.	1 40 22.83	2.08193	63.73	+15 52 35.5	+2.82343
28	303	I. L.	2 4 51.71	2.09482	64.69	+18 0 51.3	+2.78892
29	304	II. v.	2 32 16.89	2.10813	65.72	+19 57 59.6	+2.74412
30	304	II. L.	2 58 20.00	2.12136	66.81	+21 42 4.0	+2.68526
30	305	II. v.	3 25 10.58	2.13402	67.84	+23 11 6.3	+2.60679
31	305	II. L.	3 52 46.75	2.14554	68.78	+24 23 11.2	+2.49807
31	306	II. v.	4 21 4.10	2.15			



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Mean Solar Date.	Sidereal Date.	Limb and Translt.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Nov. 6	312	II. U.	10 4 32.94	2.12902	67.72	+ 8 53 55.3	-2.95977
7	312	II. L.	10 31 25.08	2.12765	67.60	+ 5 47 24.8	-2.97843
7	313	II. U.	10 58 16.46	2.12866	67.65	+ 2 34 12.4	-2.99054
8	313	II. L.	11 25 15.84	2.13207	67.89	- 0 43 1.8	-2.99623
8	314	II. U.	11 52 32.28	2.13780	68.31	- 4 1 20.6	-2.99530
9	315	II. L.	12 20 14.74	2.14567	68.93	- 7 17 39.3	-2.98722
9	315	II. U.	12 48 31.62	2.15540	69.72	-10 28 36.9	-2.97107
10	316	II. L.	13 17 29.87	2.16652	70.59	-13 30 41.1	-2.94545
10	316	II. U.	13 47 14.53	2.17826	71.55	-16 20 12.3	-2.90855
11	317	II. L.	14 17 47.73	2.18971	72.53	-18 53 33.6	-2.85740
11	317	II. U.	14 49 7.82	2.20000	73.41	-21 7 13.0	-2.78787
12	318	I. L.	15 18 40.23	2.20814	74.13	-22 58 2.5	-2.69254
13	318	I. U.	15 51 9.90	2.21330	74.63	-24 23 30.7	-2.55720
13	319	I. L.	16 23 55.26	2.21476	74.77	-25 21 55.3	-2.34788
14	319	I. U.	16 56 38.85	2.21216	74.56	-25 52 30.0	-1.92101
14	320	I. L.	17 29 2.13	2.20545	74.02	-25 55 32.8	+1.71659
15	320	I. U.	18 0 47.88	2.19493	73.12	-25 32 13.6	+2.25411
15	321	I. L.	18 31 41.97	2.18139	71.98	-24 44 30.9	+2.47060
16	321	I. U.	19 1 34.02	2.16548	70.67	-23 34 54.0	+2.60020
16	322	I. L.	19 30 18.67	2.14805	69.26	-22 6 7.0	+2.68777
17	322	I. U.	19 57 54.58	2.13004	67.81	-20 20 57.3	+2.74993
17	323	I. L.	20 24 23.65	2.11244	66.44	-18 22 5.0	+2.79540
18	323	I. U.	20 49 50.78	2.09570	65.15	-16 11 58.7	+2.82919
18	324	I. L.	21 14 22.32	2.08045	63.99	-13 52 50.4	+2.85427
19	324	I. U.	21 38 6.01	2.06707	62.99	-11 26 37.0	+2.87268
19	325	I. L.	22 1 10.05	2.05603	62.17	- 8 55 0.4	+2.88591
20	325	I. U.	22 23 43.02	2.04766	61.54	- 6 19 30.6	+2.89492
20	326	I. L.	22 45 53.46	2.04187	61.10	- 3 41 27.5	+2.90017
21	326	I. U.	23 7 49.98	2.03878	60.86	- 1 2 5.1	+2.90213
21	327	I. L.	23 29 40.94	2.03834	60.81	+ 1 37 26.9	+2.90098
22	327	I. U.	23 51 34.61	2.04076	60.94	+ 4 16 0.3	+2.89672
22	328	I. L.	0 13 39.05	2.04571	61.26	+ 6 52 24.9	+2.88910
23	329	I. U.	0 36 2.11	2.05312	61.76	+ 9 25 26.7	+2.87767
23	329	I. L.	0 58 51.20	2.06266	62.43	+11 53 44.9	+2.86178
24	330	I. U.	1 22 13.52	2.07397	63.23	+14 15 51.9	+2.84037
24	330	I. L.	1 46 15.44	2.08676	64.16	+16 30 11.6	+2.81234
25	331	I. U.	2 11 2.39	2.10069	65.20	+18 34 55.8	+2.77571
25	331	I. L.	2 36 38.56	2.11504	66.30	+20 28 10.2	+2.72771
26	332	I. U.	3 3 6.29	2.12924	67.39	+22 7 51.4	+2.66360
26	332	I. L.	3 30 25.58	2.14264	68.46	+23 31 54.0	+2.57679
27	333	I. U.	3 58 33.84	2.15458	69.43	+24 38 13.1	+2.45329
27	333	II. L.	4 29 45.93	2.16438	70.25	+25 24 53.3	+2.25888
28	334	II. U.	4 59 13.75	2.17161	70.88	+25 50 18.0	+1.85558
29	334	II. L.	5 29 5.26	2.17589	71.30	+25 53 12.0	-1.63478
29	335	II. U.	5 59 7.95	2.17711	71.42	+25 32 54.6	-2.20366
30	335	II. L.	6 29 9.28	2.17528	71.30	+24 49 20.2	-2.44004
30	336	II. U.	6 58 57.60	2.17085	70.96	+23 42 53.5	-2.58786
Dec. 1	336	II. L.	7 28 23.19	2.16429	70.44	+22 14 52.9	-2.69244
1	337	II. U.	7 57 19.45	2.15634	69.81	+20 26 33.5	-2.77029
2	337	II. L.	8 25 42.48	2.14771	69.12	+18 19 52.5	-2.82999



# 318 MOON CULMINATIONS, 1860.

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Dec. 2	338	II. U.	8 53 31.73	2.13909	68.45	+15 56 55.8	—2.87611
3	338	II. L.	9 20 49.41	2.13120	67.83	+13 19 57.5	—2.91176
3	339	II. U.	9 47 40.11	2.12470	67.32	+10 31 17.0	—2.93885
4	339	II. L.	10 14 10.07	2.12005	66.97	+ 7 33 15.9	—2.95880
4	340	II. U.	10 40 27.02	2.11760	66.78	+ 4 28 16.5	—2.97239
5	340	II. L.	11 6 39.59	2.11767	66.78	+ 1 18 44.5	—2.98003
5	341	II. U.	11 32 57.11	2.12031	66.98	— 1 52 52.1	—2.98179
6	341	II. L.	11 59 29.02	2.12558	67.38	— 5 3 58.8	—2.97767
6	342	II. U.	12 26 24.72	2.13319	67.97	— 8 11 54.1	—2.96705
7	343	II. L.	12 53 53.04	2.14286	68.73	—11 13 47.6	—2.94919
7	343	II. U.	13 22 1.77	2.15412	69.62	—14 6 39.0	—2.92260
8	344	II. L.	13 50 56.83	2.16625	70.61	—16 47 22.1	—2.88537
8	344	II. U.	14 20 41.66	2.17846	71.61	—19 12 43.9	—2.83439
9	345	II. L.	14 51 16.25	2.18994	72.56	—21 19 34.8	—2.76563
9	345	II. U.	15 22 36.38	2.19965	73.39	—23 4 58.1	—2.67130
10	346	II. L.	15 54 33.23	2.20667	73.98	—24 26 23.2	—2.53600
10	346	II. U.	16 26 53.65	2.21016	74.30	—25 21 55.8	—2.32400
11	347	II. L.	16 59 21.22	2.20973	74.26	—25 50 30.1	—1.87419
11	347	I. U.	17 29 9.92	2.20517	73.86	—25 51 59.1	+1.77364
12	348	I. L.	18 0 58.75	2.19670	73.11	—25 27 10.6	+2.27254
13	348	I. U.	18 32 3.61	2.18481	72.11	—24 37 42.2	+2.48472
13	349	I. L.	19 2 12.51	2.17012	70.88	—23 25 52.0	+2.61362
14	349	I. U.	19 31 17.76	2.15363	69.53	—24 54 20.1	+2.70092
14	350	I. L.	19 59 16.14	2.13621	68.13	—20 5 56.3	+2.76302
15	350	I. U.	20 26 8.11	2.11867	66.76	—18 3 28.8	+2.80825
15	351	I. L.	20 51 57.25	2.10185	65.48	—15 49 36.0	+2.84118
16	351	I. U.	21 16 49.29	2.08625	64.31	—13 26 43.6	+2.86516
16	352	I. L.	21 40 51.32	2.07336	63.28	—10 57 0.0	+2.88235
17	352	I. U.	22 4 11.19	2.06078	62.43	— 8 22 17.8	+2.89389
17	353	I. L.	22 26 57.45	2.05150	61.77	— 5 44 15.3	+2.90089
18	353	I. U.	22 49 18.67	2.04497	61.30	— 3 4 20.1	+2.90423
18	354	I. L.	23 11 23.50	2.04116	61.04	— 0 23 49.3	+2.90417
19	354	I. U.	23 33 20.55	2.04009	60.97	+ 2 16 6.3	+2.90106
19	355	I. L.	23 55 18.28	2.04183	61.09	+ 4 54 18.8	+2.89485
20	356	I. U.	0 17 24.98	2.04626	61.39	+ 7 29 40.6	+2.88528
20	356	I. L.	0 39 49.01	2.05323	61.89	+10 1 2.1	+2.87206
21	357	I. U.	1 2 38.10	2.06243	62.55	+12 27 9.5	+2.85449
21	357	I. L.	1 25 59.85	2.07372	63.38	+14 46 41.0	+2.83159
22	358	I. U.	1 50 1.37	2.08676	64.33	+16 58 6.2	+2.80228
22	358	I. L.	2 14 48.72	2.10099	65.39	+18 59 44.6	+2.76403
23	359	I. U.	2 40 26.90	2.11594	66.51	+20 49 45.1	+2.71401
23	359	I. L.	3 6 59.01	2.13088	67.67	+22 26 7.8	+2.64779
24	360	I. U.	3 34 25.94	2.14514	68.81	+23 46 45.5	+2.55656
24	360	I. L.	4 2 45.92	2.15809	69.85	+24 49 30.3	+2.42409
25	361	I. U.	4 31 53.81	2.16903	70.74	+25 32 20.4	+2.30753
25	361	I. L.	5 1 41.42	2.17731	71.41	+25 53 27.8	+1.68797
26	362	I. U.	5 31 57.76	2.18256	71.85	+25 51 28.0	—1.84105
26	362	I. L.	6 2 29.85	2.18455	72.01	+25 25 32.1	—2.27889
27	363	II. U.	6 35 27.71	2.18333	71.92	+24 35 27.5	—2.49170
28	363	II. L.	7 5 50.02	2.17912	71.56	+23 21 44.0	—2.62942



# MOON CULMINATIONS, 1860. 319

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascen- sion for 1 hour of Longitude.	Sidereal Time of Semi- diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Dec. 28	364	II. U.	7 55 49.87	2.17260	71.05	+21 45 30.1	-2.72814
29	364	II. L.	8 5 19.20	2.16441	70.36	+19 48 29.5	-2.80179
29	365	II. U.	8 34 13.34	2.15534	69.61	+17 32 53.0	-2.85765
30	365	II. L.	9 2 30.92	2.14607	68.87	+15 1 8.0	-2.90091
30	366	II. U.	9 30 13.63	2.13738	68.21	+12 15 54.8	-2.93212
31	366	II. L.	9 57 25.72	2.12995	67.66	+ 9 19 55.8	-2.95527
31	367	II. U.	10 24 13.19	2.12428	67.24	+ 6 15 59.0	-2.97082



# 320 MOON-CULMINATING STARS.

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	35 Piscium. 0 <sup>h</sup> 7 <sup>m</sup> .	d Piscium. 0 <sup>h</sup> 13 <sup>m</sup> .	44 Piscium. 0 <sup>h</sup> 18 <sup>m</sup> .	13 Ceti. 0 <sup>h</sup> 28 <sup>m</sup> .	δ Piscium. 0 <sup>h</sup> 41 <sup>m</sup> .	20 Ceti. 0 <sup>h</sup> 45 <sup>m</sup> .	
d.	s.	s.	s.	s.	s.	s.	
28	46.52	24.27	14.08	2.99	25.82	51.88	—010
55	46.37	24.10	13.92	2.80	25.60	51.66	+006
137	47.39	25.08	14.84	3.64	26.37	52.37	.016
164	48.20	25.89	15.69	4.42	27.14	53.13	.030
191	49.07	26.76	16.50	5.28	28.01	53.99	.030
219	49.86	27.55	17.30	6.09	28.84	54.82	.024
246	50.38	28.09	17.84	6.66	29.43	55.42	.015
273	50.64	28.35	18.12	6.97	29.78	55.77	+006
301	50.64	28.37	18.15	7.02	29.88	55.87	—002
328	50.46	28.31	18.00	6.87	29.77	55.77	.008
355	50.20	27.95	17.74	6.62	29.54	55.54	—013
Dec. =	+ 8° 3'	+ 7° 25'	+ 1° 10'	— 4° 22'	+ 6° 49'	— 1° 54'	
Mag. =	6	6.5	6	6.5	4.5	5.6	
	ε Piscium. 0 <sup>h</sup> 55 <sup>m</sup> .	e Piscium. 1 <sup>h</sup> 1 <sup>m</sup> .	ζ <sup>1</sup> Piscium. 1 <sup>h</sup> 6 <sup>m</sup> .	40 Ceti. 1 <sup>h</sup> 9 <sup>m</sup> .	μ Piscium. 1 <sup>h</sup> 22 <sup>m</sup> .	γ Piscium. 1 <sup>h</sup> 24 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
1	41.96	10.52	26.25	49.99	52.20	0.94	—012
29	41.66	10.21	25.94	49.67	51.88	0.61	.011
56	41.42	9.96	25.68	49.41	51.59	0.31	—007
165	42.87	11.26	27.04	50.69	52.80	1.55	+001
192	43.74	12.22	27.90	51.54	53.65	2.43	.031
220	44.57	13.06	28.74	52.39	54.51	3.31	.028
247	45.19	13.68	29.38	53.03	55.17	3.99	.020
274	45.56	14.07	29.78	53.48	55.61	4.45	.012
302	45.69	14.31	29.94	53.59	55.82	4.67	+003
329	45.62	14.15	29.89	53.53	55.81	4.66	—004
356	45.40	13.93	29.69	53.33	55.62	4.49	—010
Dec. =	+ 7° 8'	+ 4° 55'	+ 6° 50'	— 3° 1'	+ 5° 25'	+ 14° 37'	
Mag. =	4	6.5	5.4	6	5	4.3	
	π Piscium. 1 <sup>h</sup> 29 <sup>m</sup> .	ν Piscium. 1 <sup>h</sup> 34 <sup>m</sup> .	ο Piscium. 1 <sup>h</sup> 38 <sup>m</sup> .	ε Arietis. 1 <sup>h</sup> 49 <sup>m</sup> .	ξ <sup>1</sup> Ceti. 2 <sup>h</sup> 5 <sup>m</sup> .	δ Arietis. 2 <sup>h</sup> 10 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
2	41.95	10.06	1.43	43.79	36.30	22.12	—010
30	41.62	9.74	1.10	43.45	35.97	21.78	—011
57	41.32	9.44	0.80	43.19	35.63	21.41	+007
166	42.53	10.57	1.91	44.17	36.49	22.29	.015
193	43.40	11.42	2.77	45.05	37.32	23.15	.028
221	44.27	12.28	3.64	45.95	38.20	24.07	.028
248	44.95	12.96	4.32	46.68	38.94	24.84	.020
275	45.40	13.42	4.80	47.20	39.48	25.42	.012
303	45.62	13.64	5.04	47.48	39.79	25.77	+004
330	45.63	13.65	5.06	47.55	39.89	25.89	—003
357	45.46	13.48	4.90	47.50	39.78	25.79	—010
Dec. =	+ 11° 26'	+ 4° 47'	+ 8° 27'	+ 17° 8'	+ 8° 11'	+ 19° 15'	
Mag. =	6	5.4	4	6	4.5	6.5	
	ξ <sup>2</sup> Ceti. 2 <sup>h</sup> 20 <sup>m</sup> .	38 Arietis. 2 <sup>h</sup> 37 <sup>m</sup> .	π Arietis. 2 <sup>h</sup> 41 <sup>m</sup> .	ρ <sup>2</sup> Arietis. 2 <sup>h</sup> 48 <sup>m</sup> .	ε Arietis. 2 <sup>h</sup> 51 <sup>m</sup> .	53 Arietis. 2 <sup>h</sup> 59 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
3	44.57	21.69	30.62	33.61	14.35	34.54	—015
31	44.24	21.38	30.29	33.29	14.02	34.23	—013
58	43.89	21.00	29.91	32.90	13.62	33.83	+001
167	44.65	21.63	30.52	33.45	14.16	34.28	.010
194	45.47	22.44	31.35	34.27	14.99	35.08	.031
222	46.35	23.33	32.26	35.18	15.92	35.99	.031
249	47.10	24.11	33.06	35.99	16.75	36.81	.026
276	47.66	24.79	33.69	36.64	17.41	37.48	.019
303	48.00	25.12	34.11	37.09	17.88	37.96	.011
331	48.13	25.30	34.31	37.31	18.12	38.21	+003
358	48.05	25.25	34.27	37.29	18.10	38.22	—003
Dec. =	+ 7° 50'	+ 11° 51'	+ 16° 53'	+ 17° 28'	+ 20° 47'	+ 17° 20'	
Mag. =	4	5	6.5	6	4.5	6	



# MOON-CULMINATING STARS. 321

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	$\delta$ Arietis.	$\zeta$ Arietis.	$\tau^1$ Arietis.	$\theta$ Tauri.	$17$ Tauri.	$\gamma$ Tauri.	
	3 <sup>h</sup> 3 <sup>m</sup> .	3 <sup>h</sup> 6 <sup>m</sup> .	3 <sup>h</sup> 13 <sup>m</sup> .	3 <sup>h</sup> 28 <sup>m</sup> .	3 <sup>h</sup> 36 <sup>m</sup> .	3 <sup>h</sup> 39 <sup>m</sup> .	
d.	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	
4	39.36	53.27	10.58	46.12	35.86	11.93	—006
31	39.06	52.97	10.29	45.84	35.59	11.66	.013
59	38.64	52.53	9.86	45.39	35.14	11.21	.014
86	38.31	52.21	9.51	45.02	34.75	10.81	—010
195	39.92	53.79	11.04	46.43	36.10	12.14	+031
222	40.81	54.69	11.93	47.32	36.99	13.03	.032
250	41.66	55.56	12.81	48.22	37.91	13.95	.029
277	42.33	56.25	13.51	48.97	38.67	14.71	.022
304	42.83	56.74	14.03	49.53	39.26	15.31	.015
331	43.08	57.01	14.31	49.87	39.62	15.68	+006
359	43.09	57.03	14.35	49.94	39.71	15.79	—005
Dec. =	+ 19° 13'	+ 20° 31'	+ 20° 38'	+ 22° 45'	+ 23° 40'	+ 23° 40'	
Mag. =	4.5	4.5	5	6	4	3	
	$\Delta^1$ Tauri.	$\omega^3$ Tauri.	$\delta^1$ Tauri.	$\nu^1$ Tauri.	$\epsilon$ Tauri.	$\alpha$ Tauri.	
	3 <sup>h</sup> 56 <sup>m</sup> .	4 <sup>h</sup> 9 <sup>m</sup> .	4 <sup>h</sup> 14 <sup>m</sup> .	4 <sup>h</sup> 17 <sup>m</sup> .	4 <sup>h</sup> 20 <sup>m</sup> .	4 <sup>h</sup> 27 <sup>m</sup> .	
	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	
5	27.29	5.75	53.81	58.03	28.68	55.50	—002
32	27.04	5.52	53.60	57.79	28.46	55.30	.011
59	26.61	5.11	53.19	57.39	28.06	54.90	.016
87	26.19	4.67	52.75	56.94	27.61	54.45	—017
196	27.38	5.73	53.74	57.93	28.55	55.31	+027
223	28.25	6.58	54.57	58.79	29.39	56.12	.031
251	29.16	7.48	55.45	59.71	30.28	57.00	.031
278	29.94	8.27	56.24	60.52	31.08	57.80	.027
305	30.56	8.92	56.88	61.20	31.75	58.47	.021
332	30.97	9.36	57.33	61.67	32.21	58.94	.012
360	31.10	9.53	57.51	61.87	32.41	59.16	+001
Dec. =	+ 21° 42'	+ 20° 14'	+ 17° 13'	+ 22° 30'	+ 18° 52'	+ 16° 14'	
Mag. =	5.4	6.5	4	5.4	4.3	1	
	$\tau$ Tauri.	$\iota$ Tauri.	$\epsilon$ Aurigæ.	$\epsilon$ Tauri.	11 Orionis.	$\eta$ Tauri.	
	4 <sup>h</sup> 33 <sup>m</sup> .	4 <sup>h</sup> 43 <sup>m</sup> .	4 <sup>h</sup> 47 <sup>m</sup> .	4 <sup>h</sup> 54 <sup>m</sup> .	4 <sup>h</sup> 56 <sup>m</sup> .	5 <sup>h</sup> 10 <sup>m</sup> .	
	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	
5	52.84	13.31	55.33	46.10	36.40	54.39	.000
33	52.66	13.13	55.02	45.93	36.25	54.26	—010
60	52.24	12.73	54.56	45.53	35.86	53.87	.015
87	51.79	12.28	54.05	45.07	35.41	53.40	.014
115	51.51	11.99	53.71	44.75	35.10	53.05	—008
224	53.48	13.82	55.72	46.52	36.75	54.69	+032
251	54.36	14.68	56.69	47.40	37.62	55.55	.032
279	55.23	15.56	57.66	48.27	38.46	56.44	.029
306	55.94	16.24	58.47	49.02	39.18	57.24	.024
333	56.45	16.77	59.07	49.58	39.73	57.83	.016
360	56.76	17.09	59.37	49.89	40.02	58.18	+005
Dec. =	+ 22° 39'	+ 18° 36'	+ 32° 56'	+ 21° 23'	+ 15° 12'	+ 21° 57'	
Mag. =	4.5	5.6	3	5	5	6	
	$\beta$ Tauri.	$\sigma$ Tauri.	$\zeta$ Tauri.	129 Tauri.	136 Tauri.	1 Geminorum.	
	5 <sup>h</sup> 17 <sup>m</sup> .	5 <sup>h</sup> 19 <sup>m</sup> .	5 <sup>h</sup> 29 <sup>m</sup> .	3 <sup>h</sup> 38 <sup>m</sup> .	5 <sup>h</sup> 44 <sup>m</sup> .	3 <sup>h</sup> 55 <sup>m</sup> .	
	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	
6	29.09	16.04	19.16	44.88	34.27	39.17	+004
34	28.96	15.92	19.06	44.81	34.21	39.13	—008
61	28.55	15.54	18.68	44.45	33.83	38.79	.016
88	28.05	15.07	18.21	43.99	33.33	38.31	.016
115	27.69	14.72	17.86	43.63	32.94	37.91	—011
225	29.38	16.31	19.34	44.98	34.35	39.13	+029
252	30.29	17.17	20.19	45.79	35.23	40.01	.033
279	31.20	18.08	21.05	46.62	36.14	40.89	.033
307	32.06	18.85	21.88	47.44	37.04	41.77	.029
334	32.71	19.47	22.53	48.08	37.75	42.49	.021
361	33.08	19.62	22.91	48.48	38.20	42.95	+010
Dec. =	+ 28° 29'	+ 21° 49'	+ 21° 3'	+ 15° 45'	+ 27° 34'	+ 23° 16'	
Mag. =	2	6	3	5	5	5	



# 322 MOON-CULMINATING STARS.

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	$\gamma$ Geminorum.	$\alpha$ Aurigæ.	$\mu$ Geminorum.	$\nu$ Geminorum.	49 Aurigæ.	$\epsilon$ Geminorum.	
	6 <sup>h</sup> 6 <sup>m</sup> .	6 <sup>h</sup> 6 <sup>m</sup> .	6 <sup>h</sup> 14 <sup>m</sup> .	6 <sup>h</sup> 20 <sup>m</sup> .	6 <sup>h</sup> 26 <sup>m</sup> .	6 <sup>h</sup> 35 <sup>m</sup> .	
d.	s.	s.	s.	s.	s.	s.	
7	27.98	30.12	31.92	40.47	25.50	21.71	+ .005
34	27.94	30.10	31.92	40.49	25.53	21.77	— .008
62	27.59	29.73	31.59	40.17	25.21	21.47	.016
89	27.12	29.23	31.11	39.71	24.72	21.00	.017
116	26.73	28.80	30.72	39.40	24.28	20.56	— .009
226	27.94	30.10	31.85	40.37	25.34	21.53	+ .028
253	28.79	30.97	32.66	41.17	26.30	22.33	.032
280	29.65	31.90	33.56	42.03	27.11	23.23	.033
307	30.51	32.80	34.43	42.88	28.02	24.12	.030
335	31.26	33.56	35.19	43.66	28.85	24.95	.023
362	31.72	34.09	35.68	44.16	29.42	25.51	+ .012
Dec. =	+ 22° 39'	+ 29° 33'	+ 22° 35'	+ 20° 18'	+ 28° 8'	+ 25° 16'	
Mag. =	4	5.4	3	5.4	6.5	3.4	
	$\omega$ Geminorum.	$\zeta$ Geminorum.	$\tau$ Geminorum.	$\delta$ Geminorum.	$\iota$ Geminorum.	$\alpha^2$ Geminorum.	
	6 <sup>h</sup> 53 <sup>m</sup> .	6 <sup>h</sup> 55 <sup>m</sup> .	7 <sup>h</sup> 2 <sup>m</sup> .	7 <sup>h</sup> 11 <sup>m</sup> .	7 <sup>h</sup> 17 <sup>m</sup> .	7 <sup>h</sup> 25 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
8	55.86	50.78	16.32	48.14	4.46	42.32	+ .011
35	55.46	50.88	16.45	48.38	4.62	42.42	— .003
62	55.30	50.63	16.19	48.07	4.40	42.32	.015
90	54.73	50.17	15.69	47.62	3.93	41.73	.017
117	54.29	49.75	15.22	47.19	3.45	41.25	.013
144	54.12	49.59	14.96	46.93	3.19	40.94	— .003
254	55.92	51.28	16.78	48.55	4.84	42.54	+ .031
281	56.75	52.13	17.70	49.39	5.72	43.42	.034
308	57.66	53.01	18.65	50.28	6.60	44.42	.035
336	58.51	53.84	19.56	51.15	7.58	45.37	.030
363	59.10	54.42	20.21	51.78	8.24	46.10	+ .017
Dec. =	+ 24° 25'	+ 20° 46'	+ 30° 28'	+ 22° 14'	+ 28° 4'	+ 32° 12'	
Mag. =	6	4	5.4	3.4	4	2.1	
	$\beta$ Geminorum.	$\phi$ Geminorum.	6 Cancri.	12 Cancri.	$\zeta^1$ Cancri.	2 Cancri.	
	7 <sup>h</sup> 36 <sup>m</sup> .	7 <sup>h</sup> 44 <sup>m</sup> .	7 <sup>h</sup> 54 <sup>m</sup> .	8 <sup>h</sup> 0 <sup>m</sup> .	8 <sup>h</sup> 4 <sup>m</sup> .	8 <sup>h</sup> 12 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
8	47.31	58.26	57.62	55.15	13.26	14.91	+ .013
36	47.53	58.48	57.90	55.42	13.55	15.23	+ .003
63	47.35	58.32	57.76	55.30	13.45	15.14	— .014
90	46.92	57.90	57.36	54.94	13.08	14.78	.018
118	46.43	57.43	56.88	54.51	12.64	14.33	.014
145	46.13	57.11	56.55	54.22	12.34	13.99	— .005
255	47.60	58.50	57.84	55.23	13.47	15.07	+ .031
282	48.44	59.34	58.68	56.09	14.22	15.86	.033
309	49.39	60.28	59.62	56.95	15.10	16.66	.035
336	50.29	62.19	60.55	57.81	15.98	17.68	.031
364	51.04	61.94	61.33	58.53	16.72	18.49	+ .018
Dec. =	+ 28° 22'	+ 27° 7'	+ 28° 11'	+ 14° 3'	+ 18° 4'	+ 24° 28'	
Mag. =	1.2	5	5	6	5.4	6	
	6 Cancri.	$\gamma$ Cancri.	$\delta$ Cancri.	$\epsilon^2$ Cancri.	$\alpha$ Cancri.	$\alpha$ Cancri.	
	8 <sup>h</sup> 23 <sup>m</sup> .	8 <sup>h</sup> 35 <sup>m</sup> .	8 <sup>h</sup> 36 <sup>m</sup> .	8 <sup>h</sup> 47 <sup>m</sup> .	9 <sup>h</sup> 50 <sup>m</sup> .	9 <sup>h</sup> 0 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
9	38.78	13.30	45.93	18.63	51.95	12.06	+ .020
36	39.08	13.65	46.30	19.04	52.33	12.46	+ .006
64	39.03	13.62	46.26	19.03	52.33	12.49	— .006
91	38.69	13.29	45.95	18.71	52.05	12.23	.013
119	38.25	12.86	45.52	18.23	51.65	11.84	.014
146	37.94	12.52	45.19	17.88	51.33	11.52	— .003
255	38.88	13.36	46.00	18.63	51.99	12.08	+ .017
283	39.65	14.13	46.76	19.40	52.68	12.76	.029
310	40.52	15.02	47.62	20.32	53.52	13.58	.033
337	41.42	15.94	48.53	21.39	54.41	14.47	.031
364	42.18	16.74	49.31	22.15	55.19	15.27	+ .003
Dec. =	+ 18° 34'	+ 21° 59'	+ 18° 40'	+ 28° 28'	+ 12° 24'	+ 11° 14'	
Mag. =	6	4.5	4	6	4	5	



## MOON-CULMINATING STARS. 323

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	♄ Canceri.	♄ Canceri.	♄ Leonis.	♄ Leonis.	♄ Leonis.	♄ Leonis.	
	9 <sup>h</sup> 1 <sup>m</sup> .	9 <sup>h</sup> 11 <sup>m</sup> .	9 <sup>h</sup> 23 <sup>m</sup> .	9 <sup>h</sup> 24 <sup>m</sup> .	9 <sup>h</sup> 33 <sup>m</sup> .	9 <sup>h</sup> 37 <sup>m</sup> .	
d.	s.	s.	s.	s.	s.	s.	
10	20.76	12.08	46.08	26.09	42.90	57.40	+0.22
37	21.17	12.52	46.57	26.54	43.37	57.92	+0.20
65	21.30	12.57	46.65	26.62	43.48	58.05	—0.04
92	20.91	12.31	46.41	26.41	43.28	57.84	.009
119	20.51	11.94	46.03	26.05	42.93	57.47	.013
147	20.14	11.58	45.65	25.71	42.60	57.09	.010
174	19.97	11.39	45.44	25.51	42.40	56.85	—0.04
283	21.44	12.72	46.68	26.68	43.47	57.96	+0.28
311	22.29	13.55	47.52	27.47	44.24	58.77	.031
338	23.26	14.50	48.50	28.40	45.17	59.76	.032
365	24.11	15.34	49.38	29.23	46.01	60.66	+0.25
Dec. =	+ 23° 37'	+ 18° 18'	+ 23° 35'	+ 11° 55'	+ 11° 32'	+ 24° 25'	
Mag. =	5.6	6	5.4	6	4.3	3	
	♄ Leonis.	♄ Leonis.	♄ Leonis.	♄ Leonis.	♄ Leonis.	♄ Leonis.	
	9 <sup>h</sup> 50 <sup>m</sup> .	9 <sup>h</sup> 59 <sup>m</sup> .	10 <sup>h</sup> 0 <sup>m</sup> .	10 <sup>h</sup> 12 <sup>m</sup> .	10 <sup>h</sup> 20 <sup>m</sup> .	10 <sup>h</sup> 25 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
11	43.54	44.05	56.84	17.12	17.25	28.30	+0.26
38	44.04	44.61	57.36	17.81	17.82	28.88	.015
65	44.19	44.78	57.52	17.92	18.04	29.12	+0.03
93	44.02	44.63	57.36	17.79	17.95	29.04	—0.06
120	43.69	44.29	57.06	17.48	17.68	28.78	.010
147	43.37	43.97	56.78	17.14	17.36	28.47	.010
175	43.13	43.72	56.49	16.87	17.11	28.21	—0.04
284	44.08	44.59	57.36	17.62	17.76	28.81	+0.20
312	44.88	45.39	58.15	18.41	18.51	29.55	.029
339	45.78	46.31	59.06	19.23	19.39	30.43	.032
366	46.65	47.19	59.92	20.16	20.28	31.32	+0.25
Dec. =	+ 13° 7'	+ 17° 27'	+ 12° 39'	+ 20° 33'	+ 10° 29'	+ 10° 2'	
Mag. =	5	3.4	1.2	2	6	4	
	♄ Sextantis.	♄ Leonis.	♄ Leonis.	♄ Leonis.	♄ Leonis.	♄ Leonis.	
	10 <sup>h</sup> 38 <sup>m</sup> .	10 <sup>h</sup> 41 <sup>m</sup> .	10 <sup>h</sup> 53 <sup>m</sup> .	10 <sup>h</sup> 57 <sup>m</sup> .	11 <sup>h</sup> 8 <sup>m</sup> .	11 <sup>h</sup> 13 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
11	50.22	55.62	31.33	49.55	34.15	56.71	+0.27
39	50.84	56.26	31.99	50.22	34.86	57.41	.017
66	51.10	56.53	32.29	50.53	35.21	57.76	+0.05
94	51.04	56.48	32.37	50.53	35.23	57.90	—0.04
121	50.80	56.24	32.06	50.32	35.03	57.64	.009
148	50.51	55.94	31.77	50.04	34.75	57.26	.010
176	50.25	55.67	31.51	49.77	34.47	57.09	.008
203	50.10	55.52	31.24	49.60	34.27	56.90	—0.04
285	50.75	56.15	31.87	50.10	34.69	57.27	+0.22
313	51.46	56.87	32.66	50.78	35.26	57.92	.028
340	52.23	57.74	33.42	51.64	36.22	58.76	+0.34
Dec. =	+ 7° 7'	+ 11° 17'	+ 6° 51'	+ 8° 6'	+ 14° 4'	+ 6° 48'	
Mag. =	6	5	5	5	6	4	
	♄ Leonis.	♄ Leonis.	♄ Virginis.	♄ Virginis.	♄ Virginis.	♄ Virginis.	
	11 <sup>h</sup> 16 <sup>m</sup> .	11 <sup>h</sup> 20 <sup>m</sup> .	11 <sup>h</sup> 38 <sup>m</sup> .	11 <sup>h</sup> 43 <sup>m</sup> .	11 <sup>h</sup> 53 <sup>m</sup> .	11 <sup>h</sup> 58 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
12	39.22	46.04	41.48	25.77	43.52	6.28	+0.80
40	40.02	46.74	42.23	26.51	44.28	7.06	.022
67	40.38	47.10	42.64	26.92	44.73	7.52	.011
95	40.41	47.15	42.74	27.04	44.87	7.67	+0.03
122	40.23	46.99	42.61	26.93	44.88	7.58	—0.06
149	39.96	46.73	42.36	26.70	44.56	7.37	.011
176	39.69	46.47	42.12	26.44	44.30	7.11	.009
204	39.49	46.27	41.88	26.31	44.06	6.85	—0.05
231	39.41	46.19	41.76	26.08	43.90	6.69	+0.23
318	40.49	47.23	42.66	26.95	44.70	7.45	.024
341	41.37	48.09	43.51	27.79	45.52	8.27	+0.27
Dec. =	+ 11° 18'	+ 3° 38'	+ 7° 19'	+ 2° 38'	+ 7° 24'	+ 9° 31'	
Mag. =	4	5	4.5	3.4	4.5	4	



# 324 MOON-CULMINATING STARS.

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	Piazzi xii. 6. 12 <sup>h</sup> . 4 <sup>m</sup> .	13 Virginis. 12 <sup>h</sup> . 11 <sup>m</sup> .	$\eta$ Virginis. 12 <sup>h</sup> . 12 <sup>m</sup> .	c Virginis. 12 <sup>h</sup> . 13 <sup>m</sup> .	q Virginis. 12 <sup>h</sup> . 26 <sup>m</sup> .	$\gamma$ Virginis. 12 <sup>h</sup> . 34 <sup>m</sup> .	
d.	s.	s.	s.	s.	s.	s.	
13	31.67	31.12	45.93	15.89	34.73	35.39	+ .034
40	32.42	31.88	46.69	16.66	35.52	36.19	.026
68	32.90	32.38	47.19	17.16	36.06	36.74	.014
95	33.06	32.56	47.37	17.35	36.28	36.98	+ .001
123	32.99	32.51	47.33	17.30	36.28	37.00	— .006
150	32.81	32.32	47.15	17.11	36.12	36.85	.009
177	32.54	32.08	46.90	16.86	35.87	36.63	.010
204	32.30	31.84	46.66	16.61	35.63	36.36	— .007
232	32.12	31.65	46.46	16.42	35.40	36.13	+ .000
314	32.80	32.34	47.14	17.09	35.99	36.65	.028
341	33.56	33.12	47.92	17.87	36.76	37.39	+ .034
Dec. =	+ 4° 50'	— 0° 1'	+ 0° 7'	+ 4° 6'	— 8° 41'	— 0° 41'	
Mag. =	6.7	6	3.4	5	6	3.2	
	38 Virginis. 12 <sup>h</sup> . 46 <sup>m</sup> .	$\psi$ Virginis. 12 <sup>h</sup> . 47 <sup>m</sup> .	$\delta$ Virginis. 12 <sup>h</sup> . 48 <sup>m</sup> .	$\theta$ Virginis. 13 <sup>h</sup> . 2 <sup>m</sup> .	$\alpha$ Virginis. 13 <sup>h</sup> . 17 <sup>m</sup> .	$\zeta$ Virginis. 13 <sup>h</sup> . 27 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
14	2.53	5.92	34.49	43.43	50.22	34.82	+ .033
41	3.33	6.73	35.31	44.25	51.04	35.68	.027
69	3.94	7.31	35.90	44.90	51.71	36.33	.015
96	4.19	7.59	36.20	45.18	52.09	36.82	+ .002
123	4.22	7.63	36.24	45.23	52.23	36.87	— .000
151	4.10	7.50	36.11	45.17	52.17	36.82	.005
178	3.92	7.29	35.87	44.97	51.99	36.64	.008
205	3.61	7.02	35.58	44.70	51.73	36.37	— .010
233	3.37	6.76	35.30	44.43	51.45	36.07	+ .000
315	4.03	7.28	35.57	44.78	51.62	36.21	.030
342	5.07	8.17	36.38	45.48	52.29	36.78	+ .027
Dec. =	— 2° 47'	— 8° 47'	+ 4° 10'	— 4° 47'	— 10° 26'	+ 0° 7'	
Mag. =	6	5	3	4.5	1	3.4	
	m Virginis. 13 <sup>h</sup> . 34 <sup>m</sup> .	86 Virginis. 13 <sup>h</sup> . 38 <sup>m</sup> .	89 Virginis. 13 <sup>h</sup> . 42 <sup>m</sup> .	94 Virginis. 13 <sup>h</sup> . 58 <sup>m</sup> .	$\kappa$ Virginis. 14 <sup>h</sup> . 5 <sup>m</sup> .	$\lambda$ Virginis. 14 <sup>h</sup> . 11 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
15	17.28	29.94	16.14	54.05	26.86	33.24	+ .035
42	18.00	29.76	17.03	54.92	27.75	34.13	.032
70	18.62	31.50	17.74	55.65	28.49	34.79	.022
97	19.02	31.91	18.18	56.11	29.02	35.47	.013
124	19.20	32.09	18.37	56.34	29.22	35.66	+ .005
152	19.16	32.08	18.37	56.37	29.27	35.73	— .002
179	18.98	31.91	18.24	56.23	29.14	35.61	.007
206	18.70	31.62	17.92	55.96	28.90	35.35	.011
234	18.40	31.31	17.58	55.61	28.56	35.00	— .011
261	18.19	31.09	17.35	55.37	28.27	34.72	+ .032
343	19.21	32.09	18.35	56.22	29.05	35.48	+ .027
Dec. =	— 8° 0'	— 11° 43'	— 17° 26'	— 8° 13'	— 9° 37'	— 12° 43'	
Mag. =	6	6	5	6	4.5	5.4	
	$\mu$ Librae. 14 <sup>h</sup> . 35 <sup>m</sup> .	5 Librae. 14 <sup>h</sup> . 38 <sup>m</sup> .	$\mu$ Librae. 14 <sup>h</sup> . 41 <sup>m</sup> .	$\alpha$ Librae. 14 <sup>h</sup> . 43 <sup>m</sup> .	$\xi$ Librae. 14 <sup>h</sup> . 49 <sup>m</sup> .	20 Librae. 14 <sup>h</sup> . 55 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
16	41.89	15.61	39.75	8.89	11.35	51.77	+ .036
43	42.78	16.53	40.68	9.78	12.16	52.74	.031
70	43.53	17.32	41.46	10.60	12.94	53.60	.026
98	44.07	17.87	42.02	11.18	13.51	54.24	.017
125	44.39	18.22	42.37	11.54	13.86	54.66	.010
153	44.50	18.35	42.51	11.68	14.01	54.85	+ .002
180	44.41	18.22	42.44	11.61	13.96	54.81	— .006
207	44.18	18.03	42.20	11.36	13.72	54.55	.011
234	43.74	17.67	41.85	11.02	13.35	54.16	— .013
262	43.50	17.33	41.50	10.67	13.02	53.78	+ .029
344	44.08	17.94	42.08	11.49	13.55	54.32	+ .031
Dec. =	— 5° 3'	— 14° 53'	— 13° 34'	— 15° 27'	— 10° 52'	— 24° 44'	
Mag. =	4	6	6	2.3	6	3.4	



# MOON-CULMINATING STARS. 325

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	$\epsilon^1$ Libræ.	$\zeta^1$ Libræ.	$\gamma$ Libræ.	$\kappa$ Libræ.	$\eta$ Libræ.	$\lambda$ Libræ.	
	15 <sup>h</sup> 4 <sup>m</sup> .	15 <sup>h</sup> 20 <sup>m</sup> .	15 <sup>h</sup> 27 <sup>m</sup> .	15 <sup>h</sup> 33 <sup>m</sup> .	15 <sup>h</sup> 36 <sup>m</sup> .	15 <sup>h</sup> 45 <sup>m</sup> .	
d.	s.	s.	s.	s.	s.	s.	
17	15.43	22.41	42.28	53.63	12.74	13.13	+ .034
44	16.36	23.32	43.19	54.56	13.65	14.06	.033
71	17.18	24.15	44.02	55.41	14.39	14.93	.029
99	17.84	24.83	44.71	56.13	15.20	15.68	.022
126	18.26	25.28	45.17	56.63	15.69	16.20	.013
153	18.45	25.51	45.42	56.90	15.96	16.51	+ .005
181	18.42	25.51	45.44	56.94	16.00	16.58	— .004
208	18.19	25.30	45.24	56.75	15.81	16.40	.011
235	17.82	24.93	44.86	56.38	15.46	16.03	.014
263	17.46	24.53	44.48	55.96	15.05	15.60	.012
290	17.24	24.32	44.25	55.71	14.80	15.33	— .009
Dec. =	— 19° 15'	— 16° 13'	— 14° 19'	— 19° 13'	— 15° 13'	— 19° 45'	
Mag. =	5.4	4	4.5	5	6	6	
	$\epsilon$ Scorpii.	$\delta$ Scorpii.	$\rho^1$ Scorpii.	$\sigma$ Scorpii.	$\alpha$ Scorpii.	$\tau$ Scorpii.	
	15 <sup>h</sup> 48 <sup>m</sup> .	15 <sup>h</sup> 52 <sup>m</sup> .	15 <sup>h</sup> 57 <sup>m</sup> .	16 <sup>h</sup> 12 <sup>m</sup> .	16 <sup>h</sup> 20 <sup>m</sup> .	16 <sup>h</sup> 27 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
17	15.34	3.97	18.32	41.28	49.83	10.65	+ .038
45	16.36	4.94	19.26	42.25	50.80	11.63	.036
72	17.28	5.84	20.13	43.17	51.73	12.58	.032
99	18.06	6.56	20.86	43.97	52.53	13.42	.026
127	18.65	7.15	21.44	44.61	53.21	14.11	.019
154	18.98	7.44	21.78	44.99	53.62	14.55	+ .010
181	19.04	7.53	21.86	45.13	53.78	14.72	— .000
209	18.85	7.36	21.69	44.98	53.64	14.59	.010
236	18.44	6.98	21.33	44.61	53.29	14.22	.015
263	18.00	6.56	20.90	44.16	52.82	13.76	.014
291	17.70	6.26	20.60	43.81	52.46	13.38	— .009
Dec. =	— 28° 49'	— 22° 13'	— 19° 25'	— 25° 15'	— 26° 7'	— 27° 55'	
Mag. =	5.4	2.3	2	3.4	1.2	3.4	
	24 Scorpii.	20 Ophiuchi.	$\eta$ Ophiuchi.	A Ophiuchi.	$\xi$ Ophiuchi.	$\delta$ Ophiuchi.	
	16 <sup>h</sup> 33 <sup>m</sup> .	16 <sup>h</sup> 42 <sup>m</sup> .	17 <sup>h</sup> 2 <sup>m</sup> .	17 <sup>h</sup> 6 <sup>m</sup> .	17 <sup>h</sup> 12 <sup>m</sup> .	17 <sup>h</sup> 13 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
18	28.93	5.60	21.18	44.73	37.00	24.94	+ .030
45	29.80	6.44	22.02	45.62	37.85	25.80	.034
73	30.72	7.32	22.92	46.59	38.77	26.76	.033
100	31.56	8.08	23.72	47.46	39.62	27.63	.028
128	32.14	8.70	24.42	48.24	40.37	28.40	.021
155	32.55	9.14	24.90	48.76	40.89	28.94	.013
182	32.72	9.31	25.14	49.03	41.16	29.22	+ .002
209	32.61	9.22	25.09	49.00	41.13	29.20	— .007
237	32.27	8.88	24.76	48.65	40.82	28.87	.008
264	32.16	8.78	24.65	48.55	40.73	28.78	.015
291	31.49	8.11	23.96	47.77	39.98	28.01	— .020
Dec. =	— 17° 28'	— 10° 32'	— 15° 33'	— 26° 23'	— 20° 57'	— 24° 52'	
Mag. =	5	5	2.3	5	5	3.4	
	$\delta$ Ophiuchi.	$c^2$ Ophiuchi.	$\sigma$ Serpentis.	4 Sagittarii.	9 Sagittarii.	$\gamma$ Sagittarii.	
	17 <sup>h</sup> 17 <sup>m</sup> .	17 <sup>h</sup> 22 <sup>m</sup> .	17 <sup>h</sup> 33 <sup>m</sup> .	17 <sup>h</sup> 51 <sup>m</sup> .	17 <sup>h</sup> 55 <sup>m</sup> .	17 <sup>h</sup> 56 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
19	49.46	52.77	32.89	14.64	17.32	49.03	+ .031
46	50.32	53.62	33.67	15.44	18.12	49.87	.034
74	51.27	54.56	34.54	16.37	19.04	50.84	.034
101	52.13	55.43	35.36	17.25	19.94	51.78	.031
128	52.88	56.18	36.08	18.06	20.75	52.67	.026
156	53.46	56.78	36.66	18.73	21.43	53.37	.017
183	53.73	57.06	36.94	19.07	21.79	53.92	+ .006
210	53.67	57.02	36.94	19.03	21.85	53.82	— .005
237	53.39	56.74	36.68	18.88	21.61	53.56	.014
265	52.92	56.27	36.22	18.41	21.14	53.07	.016
292	52.50	55.85	35.82	17.97	20.69	52.49	— .019
Dec. =	— 24° 2'	— 23° 51'	— 12° 46'	— 23° 49'	— 24° 22'	— 30° 25'	
Mag. =	5	5	5.4	5	5.4	3.4	



# 326 MOON-CULMINATING STARS.

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	$\mu^1$ Sagittarii. 18 <sup>h</sup> 5 <sup>m</sup> .	$\delta$ Sagittarii. 18 <sup>h</sup> 12 <sup>m</sup> .	$\lambda$ Sagittarii. 18 <sup>h</sup> 19 <sup>m</sup> .	Bradley 2833 18 <sup>h</sup> 30 <sup>m</sup> .	$\varphi$ Sagittarii. 18 <sup>h</sup> 36 <sup>m</sup> .	29 Sagittarii. 18 <sup>h</sup> 41 <sup>m</sup> .	
d.	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	
47	24.05	2.55	20.45	0.29	55.23	22.12	+ .037
74	24.90	3.56	21.46	1.34	56.37	23.20	.035
102	25.79	4.45	22.80	2.11	57.13	23.90	.033
129	26.61	5.35	23.15	2.96	58.01	24.74	.032
156	27.25	6.07	23.86	3.68	58.76	25.47	.022
184	27.64	6.50	24.31	4.15	59.26	25.95	+ .010
211	27.73	6.59	24.42	4.29	59.42	26.04	— .004
238	27.50	6.36	24.30	4.10	59.24	25.95	.012
265	27.06	5.89	23.77	3.69	58.82	25.64	.018
293	26.62	5.40	23.29	3.20	58.32	25.08	.015
320	26.34	5.10	22.99	2.89	57.99	24.76	— .011
Dec. =	— 21° 6'	— 29° 53'	— 25° 30'	— 23° 37'	— 27° 8'	— 20° 29'	
Mag. =	4	3.4	3	5	4.3	6	
	$\nu^1$ Sagittarii. 18 <sup>h</sup> 45 <sup>m</sup> .	$\sigma$ Sagittarii. 18 <sup>h</sup> 46 <sup>m</sup> .	$\zeta$ Sagittarii. 18 <sup>h</sup> 53 <sup>m</sup> .	$\tau$ Sagittarii. 18 <sup>h</sup> 56 <sup>m</sup> .	$\chi^1$ Sagittarii. 19 <sup>h</sup> 16 <sup>m</sup> .	$\Lambda^0$ Sagittarii. 19 <sup>h</sup> 28 <sup>m</sup> .	
	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	
48	43.60	35.73	42.97	12.54	45.59	11.58	+ .029
75	44.43	36.55	43.84	13.38	46.35	12.33	.031
102	45.35	37.50	44.79	14.30	47.21	13.21	.032
130	46.21	38.42	45.74	15.24	48.20	14.18	.028
157	46.96	39.19	46.55	16.05	49.02	15.02	.023
184	47.43	39.68	47.07	16.57	49.54	15.61	.012
212	47.61	39.86	47.38	16.79	49.83	15.89	+ .000
239	47.44	39.69	47.12	16.64	49.73	15.82	— .013
266	46.93	39.27	46.69	16.23	49.36	15.46	.016
293	46.58	38.80	46.30	15.74	48.90	15.03	.013
321	46.23	38.46	45.82	15.37	48.51	14.60	— .009
Dec. =	— 22° 55'	— 26° 28'	— 30° 5'	— 27° 52'	— 24° 47'	— 25° 11'	
Mag. =	5	2.3	3.4	4.3	6	5.4	
	$\epsilon^2$ Sagittarii. 19 <sup>h</sup> 33 <sup>m</sup> .	$f$ Sagittarii. 19 <sup>h</sup> 38 <sup>m</sup> .	$\delta$ Sagittarii. 19 <sup>h</sup> 48 <sup>m</sup> .	$\Lambda$ Sagittarii. 19 <sup>h</sup> 50 <sup>m</sup> .	$c$ Sagittarii. 19 <sup>h</sup> 54 <sup>m</sup> .	Piazzix 366. 19 <sup>h</sup> 55 <sup>m</sup> .	
	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	
49	31.10	11.99	21.61	25.70	3.14	27.54	+ .025
76	31.77	12.73	22.35	26.44	3.87	28.30	.029
103	32.58	13.57	23.23	27.31	4.75	29.21	.032
131	33.46	14.48	24.20	28.27	5.72	30.21	.032
158	34.27	15.30	25.08	29.15	6.61	31.15	.027
185	34.82	15.87	25.71	29.78	7.25	31.82	.019
213	35.25	16.32	26.21	30.28	7.77	32.44	+ .005
240	35.03	16.11	26.01	30.09	7.59	32.17	— .008
267	34.62	15.69	25.58	29.67	7.17	31.73	.014
294	34.27	15.34	25.21	29.30	6.80	31.24	.014
322	33.89	14.95	24.78	28.88	6.36	30.88	— .009
Dec. =	— 16° 27'	— 20° 6'	— 27° 32'	— 26° 34'	— 28° 6'	— 32° 27'	
Mag. =	5	5	5	5	5	5	
	$\alpha^3$ Capricorni. 20 <sup>h</sup> 10 <sup>m</sup> .	$\pi$ Capricorni. 20 <sup>h</sup> 19 <sup>m</sup> .	$\varrho$ Capricorni. 20 <sup>h</sup> 20 <sup>m</sup> .	$\nu$ Capricorni. 20 <sup>h</sup> 32 <sup>m</sup> .	$\psi$ Capricorni. 20 <sup>h</sup> 37 <sup>m</sup> .	$\omega$ Capricorni. 20 <sup>h</sup> 45 <sup>m</sup> .	
	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	$\kappa$ .	
77	17.92	19.20	53.28	5.53	49.10	27.55	+ .029
104	18.71	20.04	54.08	6.31	49.91	28.36	.032
132	19.60	20.95	54.98	7.22	50.85	29.31	.033
159	20.42	21.81	55.85	8.10	51.81	30.26	.029
186	21.03	22.45	56.49	8.77	52.49	30.99	.020
213	21.38	22.84	56.88	9.18	52.94	31.45	+ .008
241	21.39	22.87	56.91	9.25	53.03	31.56	— .004
268	21.11	22.60	56.65	9.00	52.78	31.31	.012
295	20.71	22.20	56.24	8.61	52.37	30.92	.015
322	20.33	21.80	55.85	8.21	51.94	30.47	.011
350	20.16	21.59	55.64	7.98	51.69	30.20	— .005
Dec. =	— 12° 59'	— 18° 40'	— 18° 16'	— 18° 38'	— 25° 46'	— 27° 37'	
Mag. =	3.4	5	5	6.5	4.5	4.5	



# MOON-CULMINATING STARS. 327

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	$\pi$ Aquarii. 21 <sup>h</sup> 1 <sup>m</sup> .	$\epsilon$ Capricorni. 21 <sup>h</sup> 14 <sup>m</sup> .	$\zeta$ Capricorni. 21 <sup>h</sup> 18 <sup>m</sup> .	$\delta$ Capricorni. 21 <sup>h</sup> 29 <sup>m</sup> .	$\gamma$ Capricorni. 21 <sup>h</sup> 32 <sup>m</sup> .	$\delta$ Capricorni. 21 <sup>h</sup> 39 <sup>m</sup> .	
d.	R.	R.	R.	R.	R.	R.	
78	58.60	26.73	40.90	15.01	20.82	19.21	+016
105	59.32	27.46	41.63	15.70	21.30	19.88	.029
133	60.19	28.34	42.53	16.59	22.17	20.73	.032
160	61.04	29.21	43.44	17.48	23.05	21.62	.031
187	61.75	29.97	44.23	18.27	23.84	22.41	.024
214	62.31	30.47	44.76	18.81	24.38	22.96	.014
242	62.84	30.64	44.94	19.02	24.59	23.20	+002
269	62.16	30.48	44.79	18.90	24.48	23.10	-007
296	61.79	30.13	44.42	18.55	24.15	22.76	.014
324	61.40	29.72	43.99	18.15	23.75	22.39	.013
351	61.16	29.46	43.71	17.86	23.47	22.10	-008
Dec. =	- 11° 56'	- 17° 26'	- 23° 1'	- 20° 5'	- 17° 18'	- 16° 46'	
Mag. =	4.5	4.5	4	5.4	4.3	3	
	$\mu$ Capricorni. 21 <sup>h</sup> 45 <sup>m</sup> .	$\epsilon$ Aquarii. 21 <sup>h</sup> 58 <sup>m</sup> .	$\delta$ Aquarii. 22 <sup>h</sup> 9 <sup>m</sup> .	$\epsilon$ Aquarii. 22 <sup>h</sup> 12 <sup>m</sup> .	53 <sup>3</sup> Aquarii. 22 <sup>h</sup> 18 <sup>m</sup> .	$\sigma$ Aquarii. 22 <sup>h</sup> 23 <sup>m</sup> .	
	R.	R.	R.	R.	R.	R.	
79	40.24	52.99	27.18	50.32	58.80	13.65	+016
106	40.89	53.62	27.77	50.90	59.38	14.21	.025
134	41.74	54.45	28.57	51.70	60.20	15.00	.030
161	42.61	55.33	29.44	52.57	61.10	15.87	.030
188	43.40	56.14	30.24	53.37	61.92	16.69	.026
216	43.97	56.73	30.84	53.98	62.57	17.33	.016
243	44.19	56.99	31.12	54.27	62.88	17.65	+005
270	44.10	56.92	31.09	54.25	62.87	17.65	-005
297	43.79	56.63	30.83	54.00	62.62	17.42	.011
325	43.42	56.27	30.48	53.65	62.30	17.08	.012
352	43.12	55.96	30.19	53.35	61.94	16.77	-008
Dec. =	- 14° 13'	- 14° 33'	- 8° 29'	- 8° 31'	- 17° 27'	- 11° 24'	
Mag. =	5	4	4.5	5.6	6	5.4	
	$\pi$ Aquarii. 22 <sup>h</sup> 30 <sup>m</sup> .	$\tau^2$ Aquarii. 22 <sup>h</sup> 42 <sup>m</sup> .	$\delta$ Aquarii. 22 <sup>h</sup> 47 <sup>m</sup> .	$\varphi$ Aquarii. 23 <sup>h</sup> 7 <sup>m</sup> .	$\psi^1$ Aquarii. 23 <sup>h</sup> 8 <sup>m</sup> .	$\psi^2$ Aquarii. 23 <sup>h</sup> 11 <sup>m</sup> .	
	R.	R.	R.	R.	R.	R.	
25	30.42	10.73	13.20	4.52	33.47	40.87	-001
107	31.35	11.59	14.02	5.17	34.11	41.49	+022
135	32.14	12.37	14.80	5.90	34.83	42.21	.029
162	32.99	13.24	15.68	6.75	35.68	43.06	.031
189	33.80	14.09	16.53	7.59	36.54	43.91	.028
217	34.44	14.76	17.23	8.30	37.25	44.63	.019
244	34.80	15.12	17.60	8.71	37.67	45.06	+008
271	34.76	15.16	17.65	8.81	37.78	45.18	-001
298	34.55	14.96	17.46	8.68	37.64	45.05	.009
326	34.22	14.62	17.12	8.39	37.35	44.76	.011
353	33.93	14.32	16.80	8.09	37.05	44.46	-011
Dec. =	- 4° 57'	- 14° 20'	- 16° 34'	- 6° 48'	- 9° 51'	- 10° 23'	
Mag. =	5	4	3	4.5	5.4	5	
	$\pi$ Piscium. 23 <sup>h</sup> 19 <sup>m</sup> .	$\lambda$ Piscium. 23 <sup>h</sup> 34 <sup>m</sup> .	$\sigma$ Piscium. 23 <sup>h</sup> 40 <sup>m</sup> .	$\tau$ Piscium. 23 <sup>h</sup> 51 <sup>m</sup> .	$\sigma$ Piscium. 23 <sup>h</sup> 54 <sup>m</sup> .	$\sigma$ Piscium. 23 <sup>h</sup> 56 <sup>m</sup> .	
	R.	R.	R.	R.	R.	R.	
27	45.61	54.66	44.95	30.65	47.25	10.65	-007
108	46.16	55.09	45.34	30.98	47.56	10.93	+020
136	46.91	55.81	46.05	31.64	48.22	11.57	.027
163	47.74	56.63	46.87	32.44	49.01	12.37	.030
190	48.58	57.48	47.72	33.30	49.88	13.34	.029
218	49.39	58.32	48.48	34.07	50.66	14.02	.023
245	49.71	58.68	48.95	34.57	51.17	14.54	.013
272	49.84	58.85	49.14	34.79	51.39	14.77	+003
300	49.73	58.77	49.07	34.75	51.36	14.75	-005
327	49.46	58.54	48.85	34.55	51.16	14.55	.009
354	49.18	58.26	48.56	34.27	50.88	14.27	-011
Dec. =	+ 0° 29'	+ 1° 1'	- 3° 32'	- 4° 20'	- 6° 48'	- 6° 29'	
Mag. =	5.4	5	6	5.6	5	5	



## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

JANUARY.						FEBRUARY.					
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	
d.	'	"		h. m.	m.	'	"		h. m.	m.	
1.0	15	3.0	55 7.8	+1.48	U. 6 10.7	1.78	15 38.4	57 17.2	+2.35	U. 7 18.3	2.37
1.5	15	8.3	55 26.7	1.68	L. 18 32.5	1.85	15 46.2	57 45.8	2.42	L. 19 47.2	2.45
2.0	15	14.1	55 47.8	1.85	U. 6 55.1	1.93	15 54.1	58 15.2	2.45	U. 8 17.1	2.52
2.5	15	20.4	56 11.0	2.01	L. 19 18.8	2.02	16 2.2	58 44.7	2.44	L. 20 47.8	2.58
3.0	15	27.2	56 35.9	2.15	U. 7 43.6	2.12	16 10.1	59 13.8	2.37	U. 9 19.1	2.60
3.5	15	34.3	57 2.2	2.25	L. 20 9.5	2.23	16 17.5	59 41.6	2.23	L. 21 50.5	2.60
4.0	15	41.7	57 29.7	2.31	U. 8 37.0	2.33	16 24.7	60 7.3	2.03	U. 10 21.7	2.57
4.5	15	49.3	57 57.6	2.33	L. 21 5.6	2.43	16 31.0	60 30.5	1.78	L. 22 52.4	2.52
5.0	15	56.9	58 25.3	2.29	U. 9 35.4	2.53	16 36.4	60 50.3	1.47	U. 11 22.4	2.46
5.5	16	4.4	58 52.4	2.19	L. 22 6.2	2.60	16 40.6	61 5.9	1.12	L. 23 51.7	2.40
6.0	16	11.2	59 18.0	2.05	U. 10 37.7	2.64	16 43.6	61 17.0	0.72		
6.5	16	17.6	59 41.8	1.85	L. 23 9.6	2.65	16 45.3	61 23.1	+0.29	U. 12 20.2	2.33
7.0	16	23.4	60 2.8	1.60	U. 11 41.5	2.63	16 45.6	61 24.1	-0.13	L. 0 47.8	2.27
7.5	16	28.2	60 20.5	1.31			16 44.5	61 20.2	0.54	U. 13 14.7	2.22
8.0	16	32.1	60 34.6	0.98	L. 0 13.0	2.59	16 42.1	61 11.3	0.93	L. 1 41.0	2.17
8.5	16	34.8	60 44.6	0.63	U. 12 43.7	2.52	16 38.4	60 57.8	1.28	U. 14 6.8	2.14
9.0	16	36.4	60 50.4	+0.27	L. 1 13.4	2.44	16 33.6	60 40.4	1.59	L. 2 32.2	2.12
9.5	16	36.7	60 51.6	-0.10	U. 13 42.2	2.36	16 27.9	60 19.6	1.85	U. 14 57.5	2.11
10.0	16	35.9	60 48.6	0.44	L. 2 10.1	2.28	16 21.5	59 56.1	2.04	L. 3 22.8	2.11
10.5	16	34.0	60 41.6	0.76	U. 14 37.0	2.20	16 14.6	59 30.5	2.18	U. 15 48.2	2.12
11.0	16	31.1	60 30.9	1.04	L. 3 3.1	2.14	16 7.4	59 3.7	2.26	L. 4 13.7	2.14
11.5	16	27.2	60 17.0	1.29	U. 15 28.4	2.09	15 59.9	58 36.2	2.29	U. 16 39.6	2.17
12.0	16	22.7	60 0.3	1.49	L. 3 53.2	2.05	15 52.4	58 8.7	2.27	L. 5 5.8	2.20
12.5	16	17.6	59 41.4	1.64	U. 16 17.5	2.03	15 45.0	57 41.7	2.22	U. 17 32.5	2.23
13.0	16	12.0	59 21.0	1.75	L. 4 41.8	2.02	15 37.9	57 15.5	2.13	L. 5 59.5	2.26
13.5	16	6.1	58 59.6	1.81	U. 17 6.1	2.02	15 31.1	56 50.6	2.02	U. 18 26.8	2.27
14.0	16	0.1	58 37.4	1.83	L. 5 30.4	2.04	15 24.7	56 27.1	1.89	L. 6 54.1	2.28
14.5	15	54.1	58 15.2	1.83	U. 17 55.0	2.07	15 18.8	56 5.3	1.75	U. 19 21.4	2.26
15.0	15	48.3	57 53.4	1.80	L. 6 20.0	2.10	15 13.3	55 45.2	1.60	L. 7 48.5	2.24
15.5	15	42.5	57 32.3	1.74	U. 18 45.4	2.14	15 8.3	55 26.9	1.45	U. 20 15.2	2.20
16.0	15	36.8	57 11.6	1.68	L. 7 11.2	2.17	15 3.9	55 10.4	1.30	L. 8 41.5	2.16
16.5	15	31.4	56 51.8	1.60	U. 19 37.5	2.20	14 59.9	54 55.8	1.15	U. 21 7.3	2.11
17.0	15	26.4	56 33.0	1.52	L. 8 4.1	2.23	14 56.4	54 42.9	1.00	L. 9 32.3	2.04
17.5	15	21.6	56 15.3	1.43	U. 20 31.1	2.26	14 53.3	54 31.7	0.86	U. 21 56.5	1.98
18.0	15	17.0	55 58.7	1.34	L. 8 58.4	2.27	14 50.7	54 22.3	0.72	L. 10 19.9	1.91
18.5	15	12.7	55 43.2	1.25	U. 21 25.5	2.25	14 48.5	54 14.3	0.60	U. 22 42.6	1.86
19.0	15	8.9	55 28.7	1.16	L. 9 52.4	2.23	14 46.8	54 7.9	0.48	L. 11 4.6	1.80
19.5	15	5.2	55 15.4	1.07	U. 22 19.1	2.20	14 45.5	54 3.0	0.36	U. 23 26.0	1.75
20.0	15	1.8	55 3.1	0.98	L. 10 45.3	2.15	14 44.5	53 59.4	0.24	L. 11 46.8	1.73
20.5	14	58.7	54 51.8	0.90	U. 23 10.7	2.09	14 43.9	53 57.0	0.13		
21.0	14	55.9	54 41.5	0.81	L. 11 35.4	2.02	14 43.6	53 56.0	-0.03	U. 0 7.2	1.69
21.5	14	53.4	54 32.1	0.73	U. 23 59.3	1.96	14 43.6	53 56.3	+0.07	L. 12 27.3	1.66
22.0	14	51.2	54 23.8	0.65			14 44.0	53 57.7	0.18	U. 0 47.1	1.65
22.5	14	49.2	54 16.5	0.56	L. 12 22.5	1.90	14 44.8	54 0.6	0.29	L. 13 6.7	1.64
23.0	14	47.6	54 10.4	0.46	U. 0 45.0	1.84	14 46.0	54 4.8	0.41	U. 1 26.4	1.64
23.5	14	46.2	54 5.5	0.36	L. 13 6.7	1.78	14 47.5	54 10.4	0.53	L. 13 46.2	1.66
24.0	14	45.1	54 1.8	0.25	U. 1 27.6	1.73	14 49.5	54 17.6	0.66	U. 2 6.2	1.69
24.5	14	44.5	53 59.5	0.13	L. 13 48.1	1.70	14 51.8	54 26.2	0.79	L. 14 26.5	1.72
25.0	14	44.3	53 58.6	-0.00	U. 2 8.3	1.67	14 54.6	54 36.6	0.93	U. 2 47.4	1.77
25.5	14	44.5	53 59.5	+0.14	L. 14 28.0	1.64	14 57.9	54 48.6	1.07	L. 15 8.9	1.83
26.0	14	45.2	54 1.9	0.30	U. 2 47.6	1.63	15 1.7	55 2.4	1.22	U. 3 31.1	1.89
26.5	14	46.4	54 6.3	0.47	L. 15 7.2	1.64	15 5.9	55 17.9	1.37	L. 15 54.2	1.97
27.0	14	48.2	54 12.9	0.65	U. 3 27.0	1.65	15 10.6	55 35.3	1.52	U. 4 18.3	2.05
27.5	14	50.6	54 21.4	0.82	L. 15 46.8	1.67	15 15.9	55 54.6	1.67	L. 16 43.3	2.13
28.0	14	53.4	54 32.0	1.00	U. 4 6.9	1.71	15 21.6	56 15.6	1.82	U. 5 9.4	2.22
28.5	14	56.9	54 44.9	1.18	L. 16 27.6	1.75	15 27.8	56 38.4	1.97	L. 17 36.5	2.30
29.0	15	1.1	55 0.1	1.37	U. 4 49.1	1.82	15 34.4	57 2.8	2.09	U. 6 4.5	2.38
29.5	15	5.8	55 17.6	1.56	L. 17 11.3	1.89	15 41.4	57 28.4	2.19	L. 18 33.4	2.46
30.0	15	11.2	55 37.4	1.75	U. 5 34.4	1.97	15 48.7	57 55.2	2.27	U. 7 3.2	2.50
30.5	15	17.3	55 59.4	1.93	L. 17 58.5	2.06	15 56.2	58 22.8	2.30	L. 19 33.3	2.50
31.0	15	23.8	56 23.6	2.10	U. 6 23.8	2.17	16 3.8	58 50.5	2.30	U. 8 3.3	2.50
31.5	15	30.9	56 49.6	+2.24	L. 18 50.4	2.28	16 11.2	59 17.9	+2.24	L. 20 53.3	2.49



## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

MARCH.						APRIL.				
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Dif.	Meridian Translt.	Hourly Dif.	Semi-diameter.	Horizontal Parallax.	Hourly Dif.	Meridian Translt.	Hourly Dif.
d.	15	57		h. m.	m.	16	59		h. m.	m.
1.0	15 48.7	57 55.2	+2.37	U. 7 3.3	2.50	16 21.5	59 55.7	+1.56	U. 8 42.4	2.24
1.5	15 56.2	58 22.8	2.30	L. 19 33.3	2.50	16 26.3	60 13.4	1.37	L. 21 8.9	2.19
2.0	16 3.8	58 50.5	2.30	U. 8 3.3	2.50	16 30.4	60 28.5	1.13	U. 9 35.0	2.16
2.5	16 11.2	59 17.9	2.24	L. 20 33.3	2.49	16 33.7	60 40.4	0.85	L. 22 0.8	2.15
3.0	16 18.4	59 44.3	2.13	U. 9 3.0	2.48	16 36.0	60 48.8	0.54	U. 10 26.6	2.14
3.5	16 25.1	60 9.0	1.96	L. 21 32.3	2.45	16 37.2	60 53.2	+0.19	L. 22 52.3	2.15
4.0	16 31.2	60 31.4	1.73	U. 10 1.1	2.40	16 37.2	60 53.4	-0.17	U. 11 18.2	2.16
4.5	16 36.4	60 50.5	1.44	L. 22 29.2	2.35	16 36.1	60 49.2	0.53	L. 23 44.3	2.19
5.0	16 40.7	61 5.9	1.10	U. 10 56.6	2.30	16 33.7	60 40.6	0.89		
5.5	16 43.7	61 17.0	0.79	L. 23 23.5	2.26	16 30.3	60 27.9	1.22	U. 12 10.8	2.23
6.0	16 45.4	61 23.2	+0.31	U. 11 50.0	2.22	16 25.8	60 11.4	1.52	L. 0 37.8	2.27
6.5	16 45.7	61 24.5	-0.11			16 20.4	59 51.5	1.78	U. 13 5.4	2.31
7.0	16 44.7	61 20.6	0.59	L. 0 16.1	2.18	16 14.2	59 28.8	1.99	L. 1 33.4	2.36
7.5	16 42.3	61 11.9	0.92	U. 12 42.1	2.17	16 7.4	59 3.9	2.15	U. 14 1.9	2.39
8.0	16 38.6	60 58.4	1.30	L. 1 8.2	2.17	16 0.2	58 27.4	2.26	L. 2 30.7	2.41
8.5	16 33.7	60 40.6	1.63	U. 13 34.3	2.18	15 52.7	58 10.0	2.31	U. 14 59.8	2.42
9.0	16 27.9	60 19.3	1.91	L. 2 0.6	2.19	15 45.2	57 42.2	2.31	L. 3 28.8	2.41
9.5	16 21.8	59 54.9	2.14	U. 14 27.2	2.21	15 37.7	57 14.7	2.26	U. 15 57.5	2.38
10.0	16 13.9	59 27.8	2.30	L. 2 54.2	2.23	15 30.4	56 48.1	2.18	L. 4 25.8	2.33
10.5	16 6.2	58 59.6	2.40	U. 15 21.6	2.26	15 23.5	56 22.6	2.06	U. 16 53.5	2.27
11.0	15 58.3	58 30.4	2.43	L. 3 49.4	2.20	15 17.0	55 58.7	1.91	L. 5 20.4	2.20
11.5	15 50.3	58 1.1	2.42	U. 16 17.4	2.22	15 11.0	55 36.8	1.74	U. 17 46.3	2.13
12.0	15 42.4	57 32.0	2.37	L. 4 45.5	2.24	15 5.6	55 17.0	1.56	L. 6 11.4	2.05
12.5	15 34.7	57 4.2	2.27	U. 17 13.6	2.23	15 0.8	54 59.4	1.36	U. 18 35.5	1.97
13.0	15 27.4	56 37.7	2.15	L. 5 41.5	2.22	14 56.7	54 44.3	1.16	L. 6 58.7	1.90
13.5	15 20.6	56 12.6	2.00	U. 18 9.2	2.20	14 53.3	54 31.7	0.95	U. 19 21.1	1.84
14.0	15 14.4	55 49.5	1.83	L. 6 36.3	2.27	14 50.5	54 21.5	0.74	L. 7 42.8	1.78
14.5	15 8.8	55 28.5	1.65	U. 19 2.7	2.22	14 48.5	54 13.9	0.53	U. 20 3.8	1.73
15.0	15 3.7	55 9.8	1.47	L. 7 28.4	2.16	14 47.0	54 8.7	0.33	L. 8 24.4	1.70
15.5	14 59.1	54 53.3	1.27	U. 19 53.2	2.09	14 46.3	54 5.9	-0.14	U. 20 44.6	1.67
16.0	14 55.2	54 39.1	1.09	L. 8 17.2	2.02	14 46.1	54 5.3	+0.04	L. 9 4.5	1.65
16.5	14 52.0	54 27.0	0.90	U. 20 40.4	1.95	14 46.5	54 6.8	0.21	U. 21 24.3	1.65
17.0	14 49.3	54 17.2	0.72	L. 9 2.8	1.89	14 47.4	54 10.3	0.37	L. 9 44.1	1.65
17.5	14 47.2	54 9.6	0.55	U. 21 24.5	1.83	14 48.9	54 15.6	0.51	U. 22 4.0	1.67
18.0	14 45.7	54 4.1	0.38	L. 9 45.6	1.78	14 50.8	54 22.5	0.64	L. 10 24.2	1.70
18.5	14 44.7	54 0.4	0.23	U. 22 6.3	1.74	14 53.1	54 30.8	0.75	U. 22 44.8	1.73
19.0	14 44.2	53 58.6	-0.08	L. 10 26.5	1.70	14 55.7	54 40.5	0.85	L. 11 5.8	1.78
19.5	14 44.2	53 58.6	+0.05	U. 22 46.5	1.67	14 58.6	54 51.2	0.93	U. 23 27.5	1.84
20.0	14 44.6	53 59.8	0.17	L. 11 6.2	1.65	15 1.8	55 2.8	1.01	L. 11 50.0	1.90
20.5	14 45.4	54 2.6	0.29	U. 23 26.0	1.65	15 5.2	55 15.3	1.07		
21.0	14 46.5	54 6.7	0.40	L. 11 45.8	1.66	15 8.7	55 28.4	1.12	U. 0 13.2	1.97
21.5	14 47.9	54 12.2	0.50			15 12.5	55 42.1	1.16	L. 12 37.4	2.05
22.0	14 49.7	54 18.8	0.60	U. 0 5.8	1.67	15 16.3	55 56.3	1.20	U. 1 2.5	2.13
22.5	14 51.8	54 26.4	0.69	L. 12 26.1	1.69	15 20.3	56 10.8	1.22	L. 13 28.5	2.20
23.0	14 54.3	54 35.2	0.78	U. 0 46.8	1.72	15 24.3	56 25.6	1.25	U. 1 55.3	2.27
23.5	14 57.0	54 45.1	0.87	L. 13 8.0	1.75	15 28.4	56 40.7	1.27	L. 14 23.0	2.33
24.0	14 59.9	54 56.0	0.96	U. 1 29.9	1.80	15 32.6	56 56.0	1.28	U. 2 51.3	2.37
24.5	15 3.2	55 8.2	1.05	L. 13 52.6	1.87	15 36.8	57 11.5	1.29	L. 15 20.0	2.40
25.0	15 6.8	55 21.4	1.15	U. 2 16.2	1.94	15 41.0	57 27.0	1.20	U. 3 48.8	2.41
25.5	15 10.7	55 35.7	1.24	L. 14 40.6	2.01	15 45.3	57 42.7	1.21	L. 16 17.7	2.40
26.0	15 14.9	55 51.0	1.33	U. 3 5.8	2.08	15 49.6	57 58.4	1.31	U. 4 46.3	2.37
26.5	15 19.4	56 7.5	1.42	L. 15 32.1	2.16	15 53.8	58 14.1	1.30	L. 17 14.5	2.33
27.0	15 24.2	56 25.2	1.52	U. 3 59.2	2.24	15 58.0	58 29.5	1.27	U. 5 42.1	2.28
27.5	15 29.3	56 43.9	1.60	L. 16 27.2	2.30	16 2.2	58 44.7	1.24	L. 18 9.2	2.23
28.0	15 34.7	57 3.6	1.68	U. 4 55.7	2.36	16 6.2	58 59.3	1.19	U. 6 35.7	2.18
28.5	15 40.3	57 24.3	1.76	L. 17 24.5	2.40	16 10.0	59 13.2	1.12	L. 19 1.6	2.14
29.0	15 46.1	57 45.9	1.82	U. 5 53.6	2.42	16 13.5	59 26.1	1.02	U. 7 27.1	2.11
29.5	15 52.2	58 8.0	1.86	L. 18 22.6	2.42	16 16.6	59 37.7	0.90	L. 19 52.2	2.08
30.0	15 58.3	58 30.4	1.87	U. 6 51.5	2.41	16 19.3	59 47.6	0.75	U. 8 17.1	2.07
30.5	16 4.4	58 52.8	1.85	L. 19 20.1	2.39	16 21.5	59 55.5	0.57	L. 20 42.0	2.07
31.0	16 10.4	59 14.9	1.80	U. 7 48.3	2.36	16 23.0	60 1.1	0.36	U. 9 6.9	2.08
31.5	16 16.2	59 36.1	+1.70	L. 20 15.9	2.31	16 23.8	60 4.0	+0.13	L. 21 32.0	2.11



## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

MAY.						JUNE.					
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	
d.				h. m.	m.				h. m.	m.	
1.0	16 23.0	60 1.1	+0.36	U. 9 6.9	2.08	16 0.8	68 39.8	-1.02	U. 10 29.6	2.36	
1.5	16 23.8	60 4.0	+0.13	L. 21 32.0	2.11	15 57.3	68 26.7	1.16	L. 22 58.2	2.41	
2.0	16 23.8	60 4.1	-0.12	U. 9 57.6	2.15	15 53.3	68 12.0	1.29	U. 11 27.2	2.43	
2.5	16 23.0	60 1.1	0.38	L. 22 23.6	2.19	15 48.9	57 55.9	1.40	L. 23 56.5	2.43	
3.0	16 21.3	59 55.0	0.64	U. 10 50.2	2.24	15 44.2	57 38.5	1.48			
3.5	16 18.8	59 45.7	0.90	L. 23 17.5	2.30	15 39.2	57 20.2	1.56	U. 12 25.6	2.42	
4.0	16 15.4	59 33.3	1.15	U. 11 45.4	2.35	15 34.0	57 1.2	1.60	L. 0 54.4	2.38	
4.5	16 11.3	59 18.1	1.38			15 28.7	56 41.8	1.62	U. 13 22.6	2.32	
5.0	16 6.4	59 0.4	1.58	L. 0 14.0	2.40	15 23.4	56 22.4	1.60	L. 1 50.1	2.25	
5.5	16 1.0	58 40.4	1.74	U. 12 43.0	2.43	15 18.3	56 3.4	1.56	U. 14 16.6	2.17	
6.0	15 55.1	58 18.8	1.86	L. 1 12.4	2.45	15 13.8	55 45.1	1.49	L. 2 42.1	2.09	
6.5	15 48.9	57 55.9	1.95	U. 13 41.8	2.45	15 8.5	55 27.7	1.40	U. 15 6.6	2.00	
7.0	15 42.4	57 32.2	1.99	L. 2 11.0	2.42	15 4.2	55 11.6	1.27	L. 3 30.2	1.93	
7.5	15 35.9	57 8.2	1.99	U. 14 39.9	2.38	15 0.2	54 57.2	1.13	U. 15 52.9	1.85	
8.0	15 29.4	56 44.5	1.96	L. 3 8.0	2.31	14 56.8	54 44.6	0.97	L. 4 14.7	1.79	
8.5	15 23.2	56 21.4	1.88	U. 15 35.3	2.24	14 53.9	54 34.0	0.79	U. 16 35.9	1.74	
9.0	15 17.2	55 59.4	1.77	L. 4 1.8	2.16	14 51.7	54 25.8	0.59	L. 4 56.5	1.70	
9.5	15 11.6	55 38.9	1.64	U. 16 27.2	2.07	14 50.1	54 19.8	0.39	U. 17 16.7	1.67	
10.0	15 6.5	55 20.1	1.49	L. 4 51.5	1.99	14 49.1	54 16.4	-0.18	L. 5 36.6	1.65	
10.5	15 1.9	55 3.3	1.31	U. 17 15.0	1.92	14 48.9	54 15.5	+0.08	U. 17 56.4	1.65	
11.0	14 57.9	54 48.7	1.12	L. 5 37.5	1.85	14 49.3	54 17.1	0.25	L. 6 16.2	1.65	
11.5	14 54.6	54 36.5	0.91	U. 17 59.3	1.78	14 50.5	54 21.4	0.46	U. 18 36.1	1.67	
12.0	14 52.0	54 26.8	0.70	L. 6 20.3	1.73	14 52.4	54 28.2	0.67	L. 6 56.3	1.70	
12.5	14 50.0	54 19.6	0.49	U. 18 40.9	1.70	14 54.9	54 37.5	0.87	U. 19 16.9	1.74	
13.0	14 48.7	54 15.0	0.27	L. 7 1.1	1.67	14 58.0	54 49.1	1.06	L. 7 38.1	1.79	
13.5	14 48.2	54 13.0	-0.06	U. 19 21.0	1.65	15 1.8	55 2.8	1.23	U. 20 0.0	1.86	
14.0	14 48.4	54 13.5	+0.15	L. 7 40.7	1.65	15 6.1	55 18.6	1.39	L. 8 22.8	1.93	
14.5	14 49.2	54 16.5	0.35	U. 20 0.6	1.65	15 10.8	55 36.1	1.52	U. 20 46.5	2.02	
15.0	14 50.6	54 21.8	0.54	L. 8 20.5	1.67	15 16.0	55 55.1	1.63	L. 9 11.3	2.11	
15.5	14 52.6	54 29.3	0.71	U. 20 40.8	1.70	15 21.5	56 15.2	1.71	U. 21 37.1	2.20	
16.0	14 55.2	54 38.8	0.87	L. 9 1.4	1.75	15 27.1	56 36.0	1.76	L. 10 4.1	2.29	
16.5	14 58.3	54 50.1	1.01	U. 21 22.7	1.80	15 32.9	56 57.2	1.78	U. 22 32.0	2.36	
17.0	15 1.8	55 3.0	1.13	L. 9 44.6	1.86	15 38.7	57 18.5	1.76	L. 11 0.8	2.43	
17.5	15 5.7	55 17.2	1.23	U. 22 7.4	1.93	15 44.4	57 39.3	1.70	U. 23 30.3	2.48	
18.0	15 9.9	55 32.6	1.31	L. 10 31.1	2.01	15 49.8	57 59.2	1.62			
18.5	15 14.3	55 48.7	1.37	U. 22 55.7	2.10	15 54.9	58 18.0	1.50	L. 12 0.2	2.50	
19.0	15 18.8	56 5.4	1.40	L. 11 21.4	2.18	15 59.6	58 35.2	1.36	U. 0 30.2	2.50	
19.5	15 23.4	56 22.3	1.42	U. 23 48.0	2.26	16 3.8	58 50.5	1.19	L. 13 0.0	2.47	
20.0	15 28.0	56 39.3	1.41			16 7.4	59 3.8	1.01	U. 1 29.4	2.43	
20.5	15 32.6	56 56.1	1.38	L. 12 15.6	2.33	16 10.4	59 14.9	0.82	L. 13 58.2	2.37	
21.0	15 37.1	57 12.5	1.34	U. 0 44.0	2.39	16 12.8	59 23.6	0.63	U. 2 26.2	2.31	
21.5	15 41.4	57 28.2	1.28	L. 13 13.0	2.43	16 14.5	59 29.9	0.43	L. 14 53.5	2.24	
22.0	15 45.4	57 43.2	1.21	U. 1 42.3	2.45	16 15.6	59 33.9	0.24	U. 3 20.0	2.18	
22.5	15 49.3	57 57.3	1.14	L. 14 11.7	2.44	16 16.1	59 35.6	+0.06	L. 15 45.7	2.12	
23.0	15 52.8	58 10.4	1.05	U. 2 40.9	2.42	16 16.0	59 35.3	-0.11	U. 4 11.0	2.08	
23.5	15 56.1	58 22.5	0.96	L. 15 9.7	2.38	16 15.3	59 33.0	0.26	L. 16 35.7	2.05	
24.0	15 59.1	58 33.5	0.87	U. 3 38.0	2.33	16 14.3	59 29.0	0.40	U. 5 0.1	2.03	
24.5	16 1.8	58 43.4	0.78	L. 16 5.5	2.27	16 12.8	59 23.5	0.52	L. 17 24.4	2.02	
25.0	16 4.2	58 52.1	0.69	U. 4 32.4	2.21	16 10.9	59 16.6	0.62	U. 5 48.7	2.03	
25.5	16 6.3	58 59.8	0.60	L. 16 58.6	2.15	16 8.7	59 8.6	0.72	L. 18 13.1	2.05	
26.0	16 8.1	59 6.4	0.50	U. 5 24.1	2.10	16 6.2	58 59.5	0.80	U. 6 37.9	2.08	
26.5	16 9.6	59 11.9	0.41	L. 17 49.0	2.06	16 3.5	58 49.5	0.86	L. 19 3.1	2.12	
27.0	16 10.8	59 16.2	0.31	U. 6 13.6	2.04	16 0.6	58 38.8	0.93	U. 7 28.9	2.17	
27.5	16 11.6	59 19.3	0.21	L. 18 38.0	2.02	15 57.4	58 27.2	0.99	L. 19 55.3	2.23	
28.0	16 12.1	59 21.2	+0.10	U. 7 2.2	2.02	15 54.1	58 15.0	1.04	U. 8 22.3	2.28	
28.5	16 12.3	59 21.7	-0.01	L. 19 26.5	2.03	15 50.6	58 2.2	1.10	L. 20 50.0	2.32	
29.0	16 12.0	59 20.8	0.14	U. 7 51.0	2.06	15 47.0	57 48.8	1.14	U. 9 18.1	2.36	
29.5	16 11.3	59 18.3	0.28	L. 20 15.9	2.09	15 43.1	57 34.8	1.19	L. 21 46.6	2.38	
30.0	16 10.2	59 14.1	0.42	U. 8 41.4	2.14	15 39.2	57 20.3	1.22	U. 10 15.3	2.39	
30.5	16 8.6	59 8.2	0.56	L. 21 7.4	2.20	15 35.2	57 5.5	1.25	L. 22 43.9	2.38	
31.0	16 6.5	59 0.6	0.71	U. 9 34.1	2.25	15 31.0	56 50.2	1.28	U. 11 12.1	2.33	
31.5	16 3.9	58 51.1	-0.87	L. 22 1.5	2.31	15 26.8	56 34.8	-1.29	L. 23 39.9	2.28	



## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

JULY.						AUGUST.					
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	
d.	h. m.	h. m.	m.	h. m.	m.	h. m.	h. m.	m.	h. m.	m.	
1.0	15 31.0	56 50.2	-1.28	U. 11 12.1	2.33	14 58.2	54 49.7	-0.89	L. 0 4.6	1.89	
1.5	15 26.8	56 34.8	1.29	L. 23 39.9	2.28	14 55.4	54 39.5	0.81	U. 12 26.9	1.83	
2.0	15 22.6	56 19.2	1.30	U. 12 7.0	2.22	14 52.9	54 30.3	0.73	L. 0 48.5	1.77	
2.5	15 18.3	56 8.6	1.29			14 50.7	54 22.2	0.62	U. 13 9.5	1.73	
3.0	15 14.1	55 48.3	1.26	L. 0 33.2	2.15	14 48.8	54 15.3	0.51	L. 1 30.0	1.69	
3.5	15 10.1	55 33.3	1.22	U. 12 58.5	2.07	14 47.4	54 9.9	0.39	U. 13 50.1	1.67	
4.0	15 6.2	55 19.0	1.16	L. 1 22.9	1.99	14 46.3	54 5.9	0.26	L. 2 10.0	1.65	
4.5	15 2.5	55 5.4	1.09	U. 13 46.4	1.92	14 45.7	54 3.6	-0.11	U. 14 29.7	1.64	
5.0	14 59.1	54 52.8	0.99	L. 2 9.0	1.85	14 45.6	54 3.2	+0.05	L. 2 49.4	1.65	
5.5	14 56.0	54 41.5	0.88	U. 14 30.8	1.79	14 46.0	54 4.8	0.22	U. 15 9.3	1.66	
6.0	14 53.3	54 31.7	0.75	L. 2 51.9	1.74	14 47.0	54 8.5	0.40	L. 3 29.4	1.69	
6.5	14 51.1	54 23.6	0.60	U. 15 12.5	1.70	14 48.6	54 14.4	0.59	U. 15 49.9	1.73	
7.0	14 49.4	54 17.3	0.44	L. 3 32.7	1.67	14 50.8	54 22.6	0.78	L. 4 10.9	1.77	
7.5	14 48.3	54 13.1	0.26	U. 15 52.6	1.65	14 53.7	54 33.2	0.98	U. 16 32.5	1.83	
8.0	14 47.7	54 11.1	-0.07	L. 4 12.4	1.65	14 57.3	54 46.2	1.18	L. 4 54.8	1.90	
8.5	14 47.8	54 11.5	+0.13	U. 16 32.1	1.65	15 1.4	55 1.6	1.26	U. 17 18.0	1.97	
9.0	14 48.5	54 14.2	0.33	L. 4 52.0	1.66	15 6.3	55 19.4	1.58	L. 5 42.2	2.05	
9.5	14 50.0	54 19.5	0.54	U. 17 12.1	1.69	15 11.7	55 39.4	1.76	U. 18 7.3	2.14	
10.0	14 52.1	54 27.3	0.76	L. 5 32.6	1.73	15 17.8	56 1.6	1.98	L. 6 33.5	2.22	
10.5	14 54.9	54 37.6	0.97	U. 17 53.7	1.78	15 24.3	56 25.7	2.08	U. 19 0.6	2.30	
11.0	14 58.4	54 50.5	1.17	L. 6 15.4	1.85	15 31.3	56 51.5	2.20	L. 7 28.6	2.37	
11.5	15 2.6	55 5.7	1.37	U. 18 38.0	1.92	15 38.7	57 18.5	2.29	U. 19 57.4	2.42	
12.0	15 7.3	55 23.3	1.55	L. 7 1.4	2.00	15 46.3	57 46.5	2.34	L. 8 26.7	2.46	
12.5	15 12.7	55 42.9	1.71	U. 19 25.9	2.09	15 54.0	58 14.8	2.35	U. 20 56.4	2.47	
13.0	15 18.6	56 4.5	1.86	L. 7 51.5	2.18	16 1.7	58 42.9	2.31	L. 9 26.1	2.47	
13.5	15 24.9	56 27.6	1.98	U. 20 18.2	2.27	16 9.1	59 10.2	2.22	U. 21 55.7	2.45	
14.0	15 31.5	56 51.9	2.06	L. 8 45.9	2.35	16 16.2	59 36.1	2.06	L. 10 25.0	2.41	
14.5	15 38.3	57 17.0	2.11	U. 21 14.6	2.42	16 22.6	59 59.7	1.85	U. 22 53.7	2.37	
15.0	15 45.2	57 42.4	2.11	L. 9 44.0	2.47	16 28.3	60 20.6	1.59	L. 11 21.9	2.32	
15.5	15 52.1	58 7.7	2.08	U. 22 14.0	2.50	16 33.0	60 37.9	1.28	U. 23 49.5	2.28	
16.0	15 58.8	58 32.3	1.99	L. 10 44.2	2.51	16 36.7	60 51.4	0.94	L. 12 16.5	2.23	
16.5	16 5.2	58 55.6	1.86	U. 23 14.3	2.50	16 39.2	61 0.5	0.57			
17.0	16 11.0	59 17.0	1.69	L. 11 44.1	2.46	16 40.4	61 5.0	+0.18	U. 0 43.0	2.20	
17.5	16 16.2	59 36.1	1.47			16 40.4	61 4.9	-0.20	L. 13 9.2	2.17	
18.0	16 20.6	59 52.4	1.22	U. 0 13.4	2.41	16 39.1	61 0.3	0.56	U. 1 35.2	2.16	
18.5	16 24.2	60 5.5	0.95	L. 12 42.0	2.36	16 36.7	60 51.4	0.90	L. 14 1.0	2.15	
19.0	16 26.8	60 15.2	0.65	U. 1 9.9	2.29	16 33.2	60 38.6	1.21	U. 2 26.9	2.16	
19.5	16 28.5	60 21.3	0.35	L. 13 37.1	2.23	16 28.8	60 22.4	1.47	L. 14 52.9	2.18	
20.0	16 29.1	60 23.7	+0.05	U. 2 3.6	2.18	16 23.6	60 3.3	1.68	U. 3 19.2	2.21	
20.5	16 28.8	60 22.6	-0.23	L. 14 29.5	2.14	16 17.8	59 42.0	1.84	L. 15 45.8	2.24	
21.0	16 27.6	60 18.1	0.50	U. 2 54.9	2.10	16 11.5	59 19.1	1.95	U. 4 12.9	2.27	
21.5	16 25.6	60 10.5	0.74	L. 15 20.0	2.08	16 5.0	58 55.2	2.01	L. 16 40.4	2.31	
22.0	16 22.8	60 0.3	0.95	U. 3 44.9	2.08	15 58.4	58 30.8	2.03	U. 5 8.3	2.34	
22.5	16 19.3	59 47.7	1.13	L. 16 9.8	2.08	15 51.8	58 6.4	2.01	L. 17 36.5	2.36	
23.0	16 15.4	59 33.2	1.27	U. 4 34.9	2.10	15 45.2	57 42.4	1.97	U. 6 4.8	2.37	
23.5	16 11.1	59 17.3	1.37	L. 17 0.2	2.12	15 38.9	57 19.2	1.90	L. 18 33.2	2.36	
24.0	16 6.4	59 0.3	1.45	U. 5 25.8	2.16	15 32.8	56 56.9	1.81	U. 7 1.5	2.34	
24.5	16 1.6	58 42.6	1.49	L. 17 52.0	2.20	15 27.1	56 35.8	1.71	L. 19 29.4	2.30	
25.0	15 56.7	58 24.5	1.51	U. 6 18.6	2.24	15 21.7	56 15.9	1.60	U. 7 56.7	2.25	
25.5	15 51.7	58 6.3	1.51	L. 18 45.8	2.28	15 16.6	55 57.4	1.49	L. 20 23.4	2.19	
26.0	15 46.8	57 48.2	1.50	U. 7 13.4	2.32	15 11.9	55 40.2	1.37	U. 8 49.3	2.13	
26.5	15 41.9	57 30.3	1.48	L. 19 41.4	2.34	15 7.7	55 24.5	1.26	L. 21 14.4	2.06	
27.0	15 37.2	57 12.8	1.44	U. 8 9.6	2.35	15 3.7	55 10.1	1.14	U. 9 38.7	1.98	
27.5	15 32.5	56 55.7	1.40	L. 20 37.8	2.35	15 0.2	54 57.1	1.03	L. 22 2.1	1.92	
28.0	15 28.0	56 39.1	1.35	U. 9 5.9	2.32	14 57.0	54 45.4	0.91	U. 10 24.7	1.85	
28.5	15 23.7	56 23.2	1.30	L. 21 33.6	2.28	14 54.2	54 35.1	0.81	L. 22 46.6	1.80	
29.0	15 19.5	56 7.8	1.26	U. 10 0.7	2.23	14 51.8	54 26.1	0.70	U. 11 7.9	1.75	
29.5	15 15.4	55 53.0	1.20	L. 22 27.2	2.17	14 49.6	54 18.3	0.60	L. 23 28.6	1.71	
30.0	15 11.6	55 38.9	1.15	U. 10 52.8	2.10	14 47.9	54 11.8	0.49	U. 11 48.9	1.68	
30.5	15 7.9	55 25.5	1.09	L. 23 17.6	2.08	14 46.4	54 6.5	0.39			
31.0	15 4.5	55 12.8	1.03	U. 11 41.5	1.96	14 45.3	54 2.4	0.29	L. 0 9.0	1.66	
31.5	15 1.2	55 0.8	-0.96			14 44.6	53 59.6	-0.18	U. 12 28.8	1.65	



## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

SEPTEMBER.						OCTOBER.					
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transf.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transf.	Hourly Diff.	
d.	h. m.										
1.0	14 44.2	53 58.1	-0.07	L. 0 48.5	1.65	14 49.1	54 16.0	+0.57	L. 0 50.8	1.80	
1.5	14 44.1	53 58.0	+0.05	U. 13 8.3	1.66	14 51.1	54 23.6	0.68	U. 13 12.7	1.86	
2.0	14 44.5	53 59.4	0.18	L. 1 28.3	1.67	14 53.5	54 32.5	0.80	L. 1 35.4	1.92	
2.5	14 45.3	54 2.4	0.32	U. 13 48.5	1.70	14 56.2	54 42.8	0.92	U. 13 58.9	1.98	
3.0	14 46.6	54 7.1	0.46	L. 2 9.1	1.74	14 59.4	54 54.5	1.04	L. 2 23.1	2.05	
3.5	14 48.4	54 13.5	0.62	U. 14 30.2	1.78	15 3.1	55 7.8	1.17	U. 14 48.1	2.12	
4.0	14 50.8	54 21.9	0.78	L. 2 51.8	1.84	15 7.2	55 22.6	1.31	L. 3 14.0	2.17	
4.5	14 53.4	54 32.2	0.94	U. 15 14.2	1.90	15 11.7	55 39.0	1.44	U. 15 40.4	2.22	
5.0	14 56.8	54 44.6	1.12	L. 3 37.4	1.97	15 16.6	55 57.0	1.57	L. 4 7.4	2.27	
5.5	15 0.7	54 59.0	1.29	U. 16 1.4	2.04	15 21.9	56 16.6	1.70	U. 16 34.7	2.30	
6.0	15 5.3	55 15.6	1.47	L. 4 26.3	2.11	15 27.6	56 37.7	1.82	L. 5 2.5	2.32	
6.5	15 10.3	55 34.3	1.64	U. 16 52.0	2.18	15 33.7	57 0.2	1.93	U. 17 30.3	2.32	
7.0	15 16.0	55 55.0	1.81	L. 5 18.6	2.25	15 40.2	57 23.9	2.02	L. 5 58.2	2.31	
7.5	15 22.2	56 17.7	1.96	U. 17 45.9	2.30	15 46.9	57 48.6	2.08	U. 18 25.6	2.29	
8.0	15 28.8	56 42.2	2.11	L. 6 13.9	2.35	15 53.8	58 13.9	2.12	L. 6 53.0	2.26	
8.5	15 35.9	57 8.3	2.23	U. 18 42.3	2.38	16 0.8	58 39.5	2.13	U. 19 19.9	2.22	
9.0	15 43.4	57 35.6	2.32	L. 7 11.0	2.39	16 7.8	59 5.0	2.10	L. 7 46.4	2.20	
9.5	15 51.1	58 3.9	2.37	U. 19 39.8	2.39	16 14.5	59 29.8	2.03	U. 20 12.8	2.18	
10.0	15 58.9	58 32.5	2.38	L. 8 8.4	2.38	16 20.9	59 53.5	1.90	L. 8 38.7	2.16	
10.5	16 6.6	59 1.1	2.35	U. 20 36.8	2.35	16 26.8	60 15.3	1.71	U. 21 4.6	2.16	
11.0	16 14.2	59 28.9	2.26	L. 9 4.9	2.32	16 32.0	60 34.4	1.46	L. 9 30.5	2.16	
11.5	16 21.4	59 55.2	2.10	U. 21 32.6	2.29	16 36.3	60 50.3	1.17	U. 21 56.4	2.17	
12.0	16 28.0	60 19.4	1.89	L. 9 59.8	2.26	16 39.6	61 2.4	0.84	L. 10 22.4	2.19	
12.5	16 33.8	60 40.6	1.62	U. 22 26.7	2.23	16 41.8	61 10.3	0.47	U. 22 48.9	2.23	
13.0	16 38.6	60 58.3	1.30	L. 10 53.8	2.21	16 42.7	61 13.6	+0.08	L. 11 15.9	2.27	
13.5	16 42.3	61 11.8	0.93	U. 23 19.7	2.20	16 42.3	61 12.1	-0.33	U. 23 43.4	2.31	
14.0	16 44.7	61 20.7	0.53	L. 11 46.1	2.20	16 40.6	61 5.7	0.73			
14.5	16 45.7	61 24.7	+0.12			16 37.6	60 54.6	1.11	L. 12 11.4	2.37	
15.0	16 45.4	61 23.5	-0.31	U. 0 12.5	2.21	16 33.4	60 39.2	1.45	U. 0 40.2	2.42	
15.5	16 43.7	61 17.3	0.71	L. 12 39.0	2.23	16 28.2	60 19.9	1.75	L. 13 9.6	2.45	
16.0	16 40.8	61 6.4	1.10	U. 1 5.9	2.25	16 22.0	59 57.3	2.00	U. 1 39.3	2.49	
16.5	16 36.6	60 51.0	1.44	L. 13 33.1	2.29	16 15.1	59 32.1	2.20	L. 14 9.4	2.51	
17.0	16 31.3	60 31.7	1.74	U. 2 0.8	2.33	16 7.7	59 4.8	2.33	U. 2 39.7	2.52	
17.5	16 25.2	60 9.2	1.98	L. 14 29.0	2.37	15 59.9	58 36.3	2.39	L. 15 10.0	2.50	
18.0	16 18.4	59 44.2	2.16	U. 2 57.6	2.40	15 52.0	58 7.4	2.40	U. 3 39.7	2.45	
18.5	16 11.1	59 17.3	2.28	L. 15 26.5	2.42	15 44.2	57 38.6	2.38	L. 16 8.7	2.38	
19.0	16 3.5	58 49.4	2.34	U. 3 55.7	2.43	15 36.6	57 10.4	2.31	U. 4 36.8	2.30	
19.5	15 55.8	58 21.1	2.35	L. 16 25.0	2.43	15 29.3	56 43.3	2.19	L. 17 3.9	2.21	
20.0	15 48.1	57 52.9	2.32	U. 4 54.1	2.41	15 22.3	56 17.8	2.05	U. 5 29.9	2.13	
20.5	15 40.6	57 25.5	2.24	L. 17 22.9	2.37	15 15.8	55 54.3	1.89	L. 17 54.9	2.05	
21.0	15 33.4	56 59.1	2.14	U. 5 51.1	2.32	15 9.9	55 32.8	1.72	U. 6 19.0	1.97	
21.5	15 26.6	56 34.1	2.01	L. 18 18.6	2.26	15 4.6	55 13.4	1.52	L. 18 42.1	1.89	
22.0	15 20.3	56 10.8	1.86	U. 6 45.3	2.19	15 0.0	54 56.4	1.31	U. 7 4.4	1.82	
22.5	15 14.4	55 49.4	1.71	L. 19 11.1	2.11	14 56.0	54 41.9	1.12	L. 19 25.9	1.76	
23.0	15 9.1	55 29.9	1.55	U. 7 35.9	2.03	14 52.7	54 29.7	0.93	U. 7 46.7	1.72	
23.5	15 4.3	55 12.3	1.38	L. 19 59.8	1.96	14 50.0	54 19.8	0.73	L. 20 7.1	1.68	
24.0	15 0.1	54 56.7	1.22	U. 8 22.9	1.89	14 48.0	54 12.2	0.54	U. 8 27.2	1.66	
24.5	14 56.4	54 43.0	1.05	L. 20 45.2	1.83	14 46.5	54 6.7	0.36	L. 20 47.1	1.65	
25.0	14 53.2	54 31.4	0.90	U. 9 6.8	1.77	14 45.6	54 3.4	0.19	U. 9 6.9	1.64	
25.5	14 50.5	54 21.6	0.74	L. 21 27.8	1.73	14 45.2	54 2.1	-0.03	L. 21 26.6	1.66	
26.0	14 48.4	54 13.6	0.60	U. 9 48.3	1.70	14 45.4	54 2.6	+0.12	U. 9 46.6	1.68	
26.5	14 46.7	54 7.3	0.45	L. 22 8.5	1.67	14 46.0	54 4.9	0.26	L. 22 6.9	1.71	
27.0	14 45.4	54 2.7	0.32	U. 10 28.4	1.65	14 47.0	54 8.7	0.38	U. 10 27.6	1.75	
27.5	14 44.6	53 59.6	0.20	L. 22 48.2	1.65	14 48.4	54 13.9	0.49	L. 22 48.8	1.79	
28.0	14 44.1	53 58.0	-0.08	U. 11 7.9	1.65	14 50.2	54 20.4	0.59	U. 11 10.6	1.84	
28.5	14 44.1	53 57.7	+0.04	L. 23 27.8	1.67	14 52.3	54 28.1	0.68	L. 23 38.0	1.90	
29.0	14 44.4	53 58.8	0.15	U. 11 48.0	1.69	14 54.7	54 36.8	0.76	U. 11 56.2	1.97	
29.5	14 45.0	54 1.2	0.25			14 57.4	54 46.5	0.84			
30.0	14 46.0	54 4.9	0.36	L. 0 8.4	1.72	15 0.3	54 57.1	0.92	L. 0 20.2	2.03	
30.5	14 47.4	54 9.9	0.47	U. 12 29.2	1.76	15 3.4	55 8.6	1.00	U. 12 45.0	2.09	
31.0	14 49.1	54 16.0	0.57	L. 0 50.8	1.80	15 6.8	55 21.0	1.07	L. 1 10.5	2.15	
31.5	14 51.1	54 23.6	+0.68	U. 13 12.7	1.86	15 10.3	55 34.1	+1.13	U. 13 36.8	2.21	



## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

## NOVEMBER.

## DECEMBER.

Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.
d.	' "	' "	"	h. m.	m.	' "	' "	"	h. m.	m.
1.0	15 14.1	55 47.9	+1.20	L. 2 8.6	2.28	15 41.4	57 28.3	+1.15	L. 2 48.7	2.26
1.5	15 18.0	56 2.6	1.25	U. 14 30.9	2.28	15 45.1	57 41.9	1.11	U. 15 10.6	2.21
2.0	15 22.2	56 18.0	1.31	L. 2 58.3	2.28	15 48.7	57 55.1	1.08	L. 3 36.9	2.17
2.5	15 26.7	56 34.2	1.38	U. 15 25.8	2.29	15 52.2	57 7.9	1.04	U. 16 2.7	2.13
3.0	15 31.3	56 51.1	1.44	L. 3 53.3	2.28	15 55.5	58 20.3	1.00	L. 4 28.0	2.09
3.5	15 36.1	57 8.8	1.49	U. 16 20.6	2.26	15 58.7	58 32.0	0.96	U. 16 52.8	2.06
4.0	15 41.0	57 27.0	1.54	L. 4 47.5	2.22	16 1.8	58 43.3	0.91	L. 5 17.3	2.03
4.5	15 46.1	57 45.7	1.58	U. 17 13.9	2.18	16 4.7	58 53.9	0.86	U. 17 41.5	2.02
5.0	15 51.3	58 4.8	1.60	L. 5 39.9	2.15	16 7.4	59 3.9	0.79	L. 6 5.7	2.02
5.5	15 56.6	58 24.2	1.61	U. 18 5.5	2.12	16 9.9	59 13.0	0.71	U. 18 29.9	2.03
6.0	16 1.9	58 43.7	1.60	L. 6 30.8	2.09	16 12.1	59 21.1	0.62	L. 6 54.4	2.06
6.5	16 7.1	59 2.8	1.56	U. 18 55.8	2.08	16 13.9	59 28.0	0.51	U. 19 19.3	2.10
7.0	16 12.2	59 21.2	1.49	L. 7 20.6	2.07	16 15.4	59 33.3	0.37	L. 7 44.7	2.15
7.5	16 17.0	59 38.6	1.39	U. 19 45.4	2.07	16 16.4	59 36.8	0.21	U. 20 10.8	2.21
8.0	16 21.2	59 54.4	1.24	L. 8 10.3	2.09	16 16.8	59 38.4	+0.03	L. 8 37.7	2.27
8.5	16 24.9	60 8.1	1.04	U. 20 35.5	2.12	16 16.7	59 37.9	-0.16	U. 21 5.4	2.34
9.0	16 27.9	60 19.3	0.81	L. 9 1.2	2.17	16 15.9	59 35.0	0.36	L. 9 33.9	2.40
9.5	16 30.1	60 27.5	0.54	U. 21 27.5	2.22	16 14.4	59 29.6	0.57	U. 22 3.1	2.45
10.0	16 31.4	60 32.3	+0.25	L. 9 54.4	2.27	16 12.2	59 21.6	0.78	L. 10 33.0	2.50
10.5	16 31.8	60 33.5	-0.06	U. 22 22.1	2.34	16 9.3	59 11.0	0.98	U. 23 8.3	2.52
11.0	16 31.1	60 30.9	0.39	L. 10 50.6	2.41	16 5.8	58 57.9	1.18	L. 11 33.7	2.52
11.5	16 29.3	60 24.3	0.71	U. 23 19.9	2.46	16 1.6	58 42.5	1.36		
12.0	16 26.4	60 13.9	1.02	L. 11 49.8	2.51	15 56.9	58 25.1	1.52	U. 0 3.9	2.50
12.5	16 22.6	59 59.8	1.30			15 51.7	58 6.0	1.65	L. 12 33.7	2.45
13.0	16 17.9	59 42.4	1.57	U. 0 20.2	2.54	15 46.1	57 45.5	1.75	U. 1 2.7	2.38
13.5	16 12.3	59 22.0	1.80	L. 12 50.8	2.55	15 40.2	57 23.9	1.81	L. 13 30.8	2.29
14.0	16 6.1	58 59.2	1.98	U. 1 21.4	2.54	15 34.2	57 1.9	1.83	U. 1 57.8	2.20
14.5	15 59.4	58 34.5	2.11	L. 13 51.7	2.51	15 28.2	56 39.8	1.82	L. 14 23.7	2.11
15.0	15 52.3	58 8.6	2.18	U. 2 21.5	2.44	15 22.3	56 18.1	1.78	U. 2 48.5	2.02
15.5	15 45.1	57 42.1	2.21	L. 14 50.4	2.36	15 16.6	55 57.1	1.70	L. 15 12.2	1.94
16.0	15 37.9	57 15.6	2.19	U. 3 18.2	2.27	15 11.2	55 37.3	1.59	U. 3 35.0	1.87
16.5	15 30.8	56 49.6	2.13	L. 15 44.9	2.17	15 6.2	55 19.1	1.45	L. 15 57.0	1.80
17.0	15 24.0	56 24.6	2.03	U. 4 10.4	2.07	15 1.7	55 2.7	1.29	U. 4 18.3	1.75
17.5	15 17.6	56 1.0	1.90	L. 16 34.8	1.99	14 57.8	54 48.3	1.11	L. 16 39.1	1.71
18.0	15 11.7	55 39.1	1.74	U. 4 58.2	1.91	14 54.5	54 36.2	0.91	U. 4 59.5	1.68
18.5	15 6.3	55 19.3	1.56	L. 17 20.7	1.84	14 51.9	54 26.5	0.70	L. 17 19.5	1.67
19.0	15 1.5	55 1.8	1.36	U. 5 42.4	1.78	14 49.9	54 19.4	0.48	U. 5 39.4	1.66
19.5	14 57.3	54 46.7	1.16	L. 18 8.5	1.73	14 48.8	54 14.9	0.26	L. 17 59.3	1.67
20.0	14 53.9	54 34.1	0.95	U. 6 24.0	1.69	14 48.3	54 13.0	-0.04	U. 6 19.4	1.69
20.5	14 51.2	54 24.0	0.73	L. 18 44.1	1.67	14 48.5	54 13.8	+0.18	L. 18 39.8	1.72
21.0	14 49.1	54 16.5	0.51	U. 7 4.1	1.66	14 49.4	54 17.3	0.40	U. 7 0.6	1.75
21.5	14 47.8	54 11.6	0.30	L. 19 23.9	1.65	14 51.0	54 23.4	0.60	L. 19 21.9	1.80
22.0	14 47.2	54 9.2	-0.10	U. 7 43.7	1.66	14 53.3	54 31.8	0.79	U. 7 43.9	1.86
22.5	14 47.2	54 9.2	+0.09	L. 20 3.8	1.68	14 56.2	54 42.5	0.97	L. 20 6.7	1.93
23.0	14 47.8	54 11.5	0.27	U. 8 24.1	1.71	14 59.6	54 55.2	1.14	U. 8 30.3	2.01
23.5	14 49.0	54 15.9	0.44	L. 20 44.9	1.76	15 3.6	55 9.8	1.28	L. 20 54.8	2.08
24.0	14 50.8	54 22.3	0.60	U. 9 6.3	1.81	15 8.0	55 25.9	1.40	U. 9 20.3	2.15
24.5	14 53.0	54 30.5	0.75	L. 21 28.3	1.86	15 12.8	55 43.4	1.50	L. 21 46.6	2.22
25.0	14 55.6	54 40.3	0.87	U. 9 51.1	1.93	15 17.9	56 1.8	1.56	U. 10 13.7	2.28
25.5	14 58.7	54 51.5	0.97	L. 22 14.6	2.01	15 23.1	56 20.9	1.60	L. 22 41.4	2.33
26.0	15 2.1	55 3.8	1.06	U. 10 39.1	2.07	15 28.3	56 40.2	1.61	U. 11 9.6	2.36
26.5	15 5.7	55 17.1	1.14	L. 23 4.4	2.14	15 33.5	56 59.4	1.58	L. 23 38.1	2.37
27.0	15 9.5	55 31.2	1.19	U. 11 30.5	2.20	15 38.7	57 18.3	1.53		
27.5	15 13.4	55 45.7	1.22	L. 23 57.3	2.26	15 43.7	57 36.4	1.46	U. 12 6.6	2.37
28.0	15 17.5	56 0.5	1.23			15 48.3	57 53.5	1.36	L. 0 35.0	2.35
28.5	15 21.6	56 15.4	1.24	U. 12 24.7	2.30	15 52.5	58 9.2	1.24	U. 13 3.0	2.31
29.0	15 25.7	56 30.4	1.24	L. 0 52.5	2.32	15 56.3	58 23.4	1.11	L. 1 30.4	2.26
29.5	15 29.7	56 45.3	1.23	U. 13 20.5	2.33	15 59.7	58 35.9	0.97	U. 13 57.2	2.21
30.0	15 33.7	57 0.0	1.21	L. 1 48.5	2.32	16 2.7	58 46.7	0.83	L. 2 23.5	2.17
30.5	15 37.6	57 14.3	1.18	U. 14 16.3	2.30	16 5.2	58 55.8	0.68	U. 14 49.2	2.12
31.0	15 41.4	57 28.3	1.15	L. 2 43.7	2.26	16 7.2	59 3.0	0.53	L. 3 14.4	2.08
31.5	15 45.1	57 41.9	+1.11	U. 15 10.6	2.21	16 8.7	59 8.5	+0.38	U. 15 39.2	2.06



## WASHINGTON MEAN TIME.

## PHASES.

Month.	Full Moon.	Last Quarter.	New Moon.	First Quarter.	First Quarter.
	d. h. m.	d. h. m.	d. h. m.	d. h. m.	d. h. m.
January	7 22 15.2	14 13 50.5	22 7 8.5	30 12 2.7	
February	6 9 27.2	13 1 43.1	21 2 30.4	29 2 47.1	
March	6 19 36.0	13 16 0.5	21 20 47.3	29 13 44.6	
April	5 4 51.8	12 8 26.3	20 12 36.6	27 21 28.0	
May	4 13 53.6	12 2 8.2	20 1 37.8	27 2 56.5	
June	2 23 37.7	10 19 56.1	18 12 15.5	25 7 27.9	
July	2 10 58.8	10 12 49.9	17 21 12.1	24 19 32.1	
August	1 0 25.4	9 4 15.2	16 5 12.0	23 19 41.6	d. h. m.
September		7 17 58.9	14 13 1.3	21 6 16.7	30 15 49.2
October		7 5 56.6	13 21 29.4	20 21 2.4	29 8 31.6
November		5 16 9.3	12 7 28.2	19 15 44.5	29 1 41.7
December		5 0 52.6	11 19 40.3	19 13 1.6	27 18 29.7
					27 10 9.2

## PERIGEE, APOGEE, AND LIBRATION.

Month.	Perigee.	Apogee.	Perigee.	GREATEST LIBRATION.		
	d. h.	d. h.	d. h.	d. h. m.	d. h. m.	d. h. m.
January	9 9.7	25 0.3		3 15 7 N.E.	16 0 25 N.W.	31 22 17 N.E.
February	6 20.5	21 3.6		13 0 52 N.W.	29 5 9 N.E.	
March	6 10.9	19 8.0		12 8 10 N.W.	28 4 10 N.E.	
April	3 18.4	15 21.3	d. h.	9 14 20 N.W.	24 5 44 N.E.	
May	1 18.3	13 15.4	28 10.2	7 14 8 S.W.	20 12 29 N.E.	
June		10 10.1	22 16.3	4 1 55 S.W.	16 13 44 N.E.	30 17 45 N.W.
July		8 4.4	20 2.1	14 6 57 N.E.	27 4 26 N.W.	
August		4 20.6	17 5.9	11 8 40 N.E.	23 16 3 N.W.	
September		1 6.8	14 15.2	8 14 8 S.E.	20 17 30 S.W.	
September		28 8.1				
October	13 2.1	25 14.2		6 18 27 S.E.	18 23 20 S.W.	
November	10 9.8	22 6.3		3 12 4 S.E.	16 3 47 S.W.	29 22 54 S.E.
December	8 2.9	20 2.4		14 0 46 S.W.	26 10 33 S.E.	

## MOON'S EQUATOR.

The moon's libration in latitude and longitude, at any time, may be found by means of the following formulas and tables.

$I$  = the inclination of the moon's equator  $1^{\circ} 28'.8$ ,

$\Omega$  = mean longitude of moon's ascending node (see page 250),

$C$  = the angle which the mean meridian of the moon's disc makes with the circle of declination reckoned from north to west on the apparent disc.

$\lambda$ ,  $\beta$ ,  $\alpha'$ , and  $\delta'$  the apparent longitude, latitude, right ascension, and declination of the moon affected with parallax.

$$\Delta \lambda = 0'.57 \sin 2 (\lambda - \Omega),$$

$$\alpha = \cos (\Omega - \lambda) \sin I,$$

$$\tan B = \sin (\Omega - \lambda) \tan I.$$

In these formulas, the tables p. 8 of the Appendix may be substituted.

The libration in latitude =  $b = B - \beta$ .

The libration in longitude =  $l = \lambda + \Delta \lambda + \alpha b - C$ .

$$\sin C = \sin i \frac{\cos (C + l - \Omega + \Delta)}{\cos \delta'} = - \sin i \frac{\cos (\alpha' - \Omega')}{\cos b}.$$



## WASHINGTON MEAN TIME.

## MOON'S EQUATOR.

Sidereal Date Ob.	i Inclination to the Earth's Equator.	$\Delta$ Ascending Node on Earth's Equator to Ascending Node on Ecliptic.	$\Omega'$ Ascending Node on Earth's Equator.	$\zeta$ Moon's Mean Longitude.
d.	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$
0	22 28.7	130 12.3	2 50.3	9 1.9
10	22 29.3	129 39.4	2 51.6	140 26.1
20	22 29.9	129 6.5	2 53.0	272 50.4
30	22 30.6	128 33.6	2 54.3	43 14.6
40	22 31.2	128 0.7	2 55.7	174 38.9
50	22 31.8	127 27.8	2 57.0	306 3.1
60	22 32.5	126 54.9	2 58.3	77 27.4
70	22 33.1	126 22.1	2 59.5	208 51.6
80	22 33.8	125 49.2	3 0.8	340 15.9
90	22 34.4	125 16.4	3 2.0	111 40.1
100	22 35.1	124 43.5	3 3.3	243 4.4
110	22 35.8	124 10.7	3 4.5	14 28.6
120	22 36.5	123 38.0	3 5.6	145 52.9
130	22 37.2	123 5.2	3 6.8	277 17.1
140	22 37.9	122 32.5	3 7.9	48 41.4
150	22 38.6	121 59.7	3 9.1	180 5.6
160	22 39.3	121 27.0	3 10.2	311 29.8
170	22 40.0	120 54.3	3 11.3	82 54.1
180	22 40.7	120 21.7	3 12.3	214 18.3
190	22 41.4	119 49.0	3 13.4	345 42.6
200	22 42.1	119 16.3	3 14.5	117 6.8
210	22 42.8	118 43.7	3 15.5	248 31.1
220	22 43.5	118 11.1	3 16.5	19 55.3
230	22 44.3	117 38.5	3 17.5	151 19.6
240	22 45.0	117 5.0	3 18.5	282 43.8
250	22 45.7	116 33.3	3 19.5	54 8.1
260	22 46.4	116 0.8	3 20.4	185 32.3
270	22 47.2	115 28.3	3 21.3	316 56.6
280	22 47.9	114 55.7	3 22.2	88 20.8
290	22 48.7	114 23.2	3 23.1	219 45.1
300	22 49.4	113 50.7	3 24.0	351 9.3
310	22 50.1	113 18.3	3 24.8	122 33.5
320	22 50.9	112 45.9	3 25.6	253 57.8
330	22 51.6	112 13.4	3 26.4	25 22.0
340	22 52.4	111 41.0	3 27.2	156 46.3
350	22 53.1	111 8.6	3 28.0	288 10.5
360	22 53.9	110 36.3	3 28.7	59 34.8
370	22 54.7	110 4.0	3 29.4	190 59.0



## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.				Apparent Declination.				Log. Coefficient of $t$ .		Log. Coefficient of $t^2$ .		Mean Solar Time of Meridian Transit.	Sidereal Date of Transit.
	At Mean Noon.		At Transit.		At Mean Noon.		At Transit.		In R.A.	In Dec.	In R.A.	In Dec.		
	d. h. m. s.	m. s.	d. h. m. s.	m. s.	d. h. m. s.	m. s.	d. h. m. s.	m. s.						
Jan.	1	17 7 56.76	7 42.37		20 47 31.6	46 40.2			+9.18238	-9.7361	+4.64	-4.63	0 22 25.6	0
	2	17 11 45.80	11 30.25		20 60 44.3	59 52.0			9.21753	9.7433	4.60	-4.20	1 22 25.5	1
	3	17 15 51.50	15 34.92		21 14 3.6	13 11.2			9.24549	9.7442	4.56	+3.87	2 22 25.6	2
	4	17 20 12.19	19 54.75		21 27 19.8	26 28.1			9.26923	9.7400	4.51	4.46	3 22 26.0	3
	5	17 24 46.41	24 28.25		21 40 23.9	39 33.6			9.28959	9.7311	4.47	4.67	4 22 26.6	4
	6	17 29 32.86	29 14.11		21 53 8.3	52 19.9			9.30723	9.7178	4.43	4.81	5 22 27.4	5
	7	17 34 30.37	34 11.15		22 5 26.0	4 40.0			9.32258	9.7002	4.38	4.90	6 22 28.4	6
	8	17 39 37.91	39 18.33		22 17 10.8	16 27.6			9.33610	9.6781	4.34	4.97	7 22 29.6	7
	9	17 44 54.57	44 34.74		22 28 17.1	27 37.1			9.34806	9.6515	4.30	5.02	8 22 30.9	8
	10	17 50 19.55	49 59.56		22 38 40.4	38 3.8			9.35866	9.6198	4.26	5.06	9 22 32.4	9
	11	17 55 52.10	55 32.04		22 48 16.1	47 43.1			9.36811	9.5819	4.22	5.09	10 22 34.0	10
	12	18 1 31.58	1 11.53		22 57 0.5	56 31.3			9.37661	9.5384	4.18	5.12	11 22 35.7	11
	13	18 7 17.42	6 57.45		23 4 50.1	4 24.8			9.38426	9.4860	4.15	5.15	12 22 37.5	12
	14	18 13 9.10	12 49.29		23 11 41.5	11 20.1			9.39115	9.4231	4.11	5.16	13 22 39.5	13
	15	18 19 6.12	18 46.52		23 17 32.3	17 14.8			9.39738	9.3461	4.07	5.18	14 22 41.5	14
	16	18 25 8.05	24 48.72		23 22 19.8	22 6.2			9.40304	9.2483	4.04	5.20	15 22 43.5	15
	17	18 31 14.51	30 55.50		23 26 1.9	25 52.1			9.40820	9.1168	4.00	5.21	16 22 45.7	16
	18	18 37 25.16	37 6.52		23 28 36.2	28 30.1			9.41289	8.9203	3.97	5.22	17 22 47.9	17
	19	18 43 39.65	43 21.42		23 30 1.1	29 58.6			9.41718	-8.5371	3.93	5.23	18 22 50.2	18
	20	18 49 57.71	49 39.94		23 30 14.9	30 15.8			9.42111	+8.1919	3.90	5.24	19 22 52.6	19
	21	18 56 19.04	56 1.76		23 29 15.9	29 20.1			9.42470	8.8228	3.86	5.25	20 22 55.0	20
	22	19 2 43.40	2 26.65		23 27 3.0	27 10.3			9.42799	9.0734	3.83	5.26	21 22 57.5	21
	23	19 9 10.56	8 54.37		23 23 34.7	23 44.9			9.43100	9.2336	3.79	5.27	22 23 0.0	22
	24	19 15 40.30	15 24.70		23 18 49.6	19 2.4			9.43376	9.3520	3.76	5.27	23 23 2.6	23
	25	19 22 12.41	21 57.43		23 12 46.9	13 2.1			9.43629	9.4459	3.72	5.28	24 23 5.2	24
	26	19 28 46.72	28 32.38		23 5 25.5	5 42.9			9.43862	9.5239	3.69	5.28	25 23 7.8	25
	27	19 35 23.06	35 9.39		22 56 44.6	57 3.9			9.44076	9.5907	3.66	5.29	26 23 10.4	26
	28	19 42 1.28	41 48.30		22 46 43.2	47 4.1			9.44271	9.6493	3.62	5.29	27 23 13.1	27
	29	19 48 41.21	48 28.93		22 35 20.2	35 42.4			9.44451	9.7013	3.58	5.29	28 23 15.9	28
	30	19 55 22.74	55 11.18		22 22 35.3	22 58.5			9.44617	9.7481	3.55	5.29	29 23 18.6	29
	Feb.	31	20 2 5.73	1 54.91		22 8 27.9	8 51.8			9.44767	9.7906	3.52	5.30	30 23 21.4
1		20 8 50.09	8 40.02		21 52 57.1	53 21.3			9.44910	9.8297	3.48	5.30	0 23 24.2	31
2		20 15 35.70	15 26.40		21 36 2.3	36 26.5			9.45039	9.8657	3.45	5.31	1 23 27.0	32
3		20 22 22.48	22 13.96		21 17 43.0	18 6.9			9.45158	9.8993	3.42	5.31	2 23 29.9	33
4		20 29 10.33	29 2.60		20 57 58.4	58 21.6			9.45269	9.9306	3.39	5.31	3 23 32.7	34
5		20 35 59.20	35 52.27		20 36 48.2	37 10.4			9.45372	9.9599	3.35	5.32	4 23 35.6	35
6		20 42 49.00	42 42.88		20 14 12.1	14 33.0			9.45468	9.9875	3.32	5.32	5 23 38.5	36
7		20 49 39.68	49 34.38		19 50 9.9	50 29.1			9.45558	0.0136	3.29	5.32	6 23 41.4	37
8		20 56 31.19	56 26.71		19 24 40.9	24 58.0			9.45643	0.0382	3.27	5.32	7 23 44.3	38
9		21 3 23.47	3 19.82		18 57 44.9	57 59.6			9.45722	0.0616	3.24	5.32	8 23 47.3	39
10		21 10 16.49	10 13.68		18 29 21.7	29 33.6			9.45797	0.0839	3.22	5.32	9 23 50.2	40
11		21 17 10.20	17 8.24		17 59 31.2	59 39.9			9.45868	0.1051	3.20	5.32	10 23 53.2	41
12		21 24 4.57	24 3.46		17 28 13.2	28 18.3			9.45935	0.1253	3.18	5.32	11 23 56.2	42
13		21 30 59.57	30 59.32		16 55 27.8	55 29.0			9.45999	0.1446	3.16	5.32	12 23 59.1	43
14		21 37 55.16	37 55.77		16 21 15.0	21 11.9			9.46060	0.1631	3.13	5.32	14 0 2.1	44
15		21 44 51.31	44 52.79		15 45 35.1	45 27.3			9.46116	0.1807	3.09	5.32	15 0 5.1	45
16		21 51 47.98	51 50.33		15 8 28.6	8 15.8			9.46167	0.1976	3.05	5.32	16 0 8.1	46
17		21 58 45.12	58 48.35		14 29 55.9	29 37.7			9.46214	0.2137	2.99	5.31	17 0 11.1	47
18		22 5 42.68	5 46.79		13 49 57.7	49 33.7			9.46254	0.2291	2.92	5.31	18 0 14.2	48
19		22 12 40.59	12 45.58		13 8 35.0	8 4.9			9.46286	0.2438	2.79	5.30	19 0 17.2	49
20		22 19 38.76	19 44.63		12 25 49.2	25 12.6			9.46308	0.2577	2.53	5.29	20 0 20.2	50
21		22 26 37.07	26 43.82		11 41 41.9	40 58.5			9.46316	0.2710	+1.38	5.28	21 0 23.3	51
22		22 33 35.39	33 43.02		10 56 15.2	55 24.7			9.46310	0.2834	-2.58	5.27	22 0 26.3	52
23		22 40 33.55	40 42.06		10 9 31.4	8 33.5			9.46283	0.2951	2.96	5.25	23 0 29.3	53
24		22 47 31.33	47 40.71		9 21 33.7	20 28.2			9.46229	0.3060	3.21	5.23	24 0 32.4	54
25		22 54 28.44	54 38.67		8 32 26.0	31 12.8			9.46142	0.3160	3.38	5.20	25 0 35.4	55
26		23 1 24.55	1 35.62		7 42 12.4	40 51.3			9.46018	0.3251	3.53	5.16	26 0 38.4	56
27		23 8 19.26	8 31.14		6 50 58.6	49 29.6			9.45847	0.3333	3.66	5.12	27 0 41.3	57
28		23 15 12.07	15 24.73		5 58 50.5	57 13.5			9.45618	0.3403	3.77	5.05	28 0 44.3	58
29		23 22 2.41	22 15.81		5 5 55.5	4 10.7			9.45320	0.3462	3.89	4.96	29 0 47.2	59
30		23 28 49.55	29 3.63		4 12 22.3	10 30.0			9.44939	0.3507	3.98	4.84	30 0 50.0	60
31	23 35 32.70	35 47.40		3 18 20.4	16 21.1			+9.44460	+0.3539	-4.07	+4.62	31 0 52.8	61	



## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ .		Log. Coefficient of $t^2$ .		Mean Solar Time of Meridian Transit.	Side- real Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
d.	h. m. s.	m. s.	° ' "	° ' "					d. h. m.	d.
Mar. 1	23 28 49.55	29 8.63	- 4 12 22.3	10 30.0	+9.44939	+0.3507	-3.98	+4.84	1 0 50.0	60
2	23 35 32.70	35 47.40	3 18 20.4	16 21.1	9.44460	0.3539	4.07	4.62	2 0 52.8	61
3	23 42 10.92	42 26.16	2 24 1.0	21 55.2	9.43866	0.3554	4.15	+4.11	3 0 55.5	62
4	23 48 43.15	48 58.84	1 29 36.2	27 24.6	9.43139	0.3552	4.24	-4.30	4 0 58.1	63
5	23 55 8.20	55 24.22	- 0 35 19.7	33 3.2	9.42256	0.3531	4.31	4.75	5 1 0.6	64
6	0 1 24.74	1 40.97	+ 0 18 33.6	20 54.1	9.41194	0.3490	4.38	4.97	6 1 2.9	66
7	0 7 31.35	7 47.65	1 11 48.1	14 11.2	9.39927	0.3426	4.44	5.13	7 1 5.1	67
8	0 13 26.49	13 42.71	2 4 6.6	6 31.0	9.38428	0.3336	4.50	5.25	8 1 7.0	68
9	0 19 8.56	19 24.54	2 55 11.7	57 35.9	9.36662	0.3219	4.55	5.34	9 1 8.8	69
10	0 24 35.90	24 51.47	3 44 45.8	47 8.4	9.34594	0.3074	4.60	5.42	10 1 10.3	70
11	0 29 46.81	30 1.79	4 32 31.3	34 50.5	9.32181	0.2895	4.64	5.48	11 1 11.5	71
12	0 34 39.65	34 53.87	5 18 10.6	20 24.7	9.29376	0.2682	4.68	5.54	12 1 12.4	72
13	0 39 12.76	39 26.06	6 1 26.4	3 33.9	9.26111	0.2427	4.71	5.59	13 1 13.0	73
14	0 43 24.61	43 36.84	6 42 2.3	44 1.7	9.22311	0.2128	4.74	5.63	14 1 13.3	74
15	0 47 13.75	47 24.76	7 19 43.1	21 32.9	9.17872	0.1777	4.76	5.66	15 1 13.1	75
16	0 50 38.88	50 48.57	7 54 14.1	55 53.2	9.12653	0.1365	4.78	5.69	16 1 12.6	76
17	0 53 38.86	53 47.14	8 25 23.1	26 50.5	9.06450	0.0880	4.80	5.71	17 1 11.6	77
18	0 56 12.74	56 19.56	8 52 57.7	54 12.7	8.98941	0.0300	4.81	5.74	18 1 10.2	78
19	0 58 19.73	58 25.07	9 16 46.2	17 48.2	8.96000	9.9596	4.82	5.75	19 1 8.4	79
20	0 59 59.29	60 3.19	9 36 39.4	37 28.3	8.77505	9.8722	4.82	5.77	20 1 6.1	80
21	1 1 11.25	1 13.78	9 52 30.3	53 6.4	8.60611	9.7594	4.82	5.78	21 1 3.3	81
22	1 1 55.62	1 56.88	10 4 13.1	4 37.0	8.32842	9.6027	4.82	5.78	22 1 0.1	82
23	1 2 12.76	2 12.89	10 11 43.1	11 55.6	+7.41567	9.3502	4.81	5.79	23 0 56.4	83
24	1 2 3.38	2 2.55	10 14 57.8	14 59.9	-8.18985	+8.6680	4.79	5.79	24 0 52.3	84
25	1 1 28.54	1 26.96	10 13 57.7	13 51.4	8.51443	-9.1124	4.76	5.78	25 0 47.8	85
26	1 0 29.71	0 27.61	9 8 46.1	8 33.1	8.68811	9.4803	4.73	5.77	26 0 42.9	86
27	0 59 8.70	59 6.31	9 59 29.7	59 12.0	8.80228	9.6713	4.68	5.75	27 0 37.6	87
28	0 57 27.74	57 25.29	9 46 18.2	45 58.1	8.88325	9.7982	4.62	5.73	28 0 32.0	88
29	0 55 29.37	55 27.08	9 29 24.6	29 4.3	8.94236	9.8904	4.55	5.69	29 0 26.1	89
30	0 53 16.42	53 14.49	9 9 6.3	8 48.1	8.98506	9.9598	4.44	5.64	30 0 20.0	90
31	0 50 52.05	50 50.64	8 45 46.0	45 32.0	9.01464	0.0128	4.29	5.58	31 0 13.6	91
Apr. 1	0 48 19.52	48 18.75	8 19 47.7	19 39.6	9.03310	0.0532	4.06	5.50	1 0 7.2	92
2	0 45 42.22	45 42.15	7 51 39.1	51 38.3	9.04168	0.0830	-3.54	5.38	2 0 0.6	93
3	0 43 3.48	43 4.13	7 21 49.9	21 57.4	9.04109	0.1037	+3.64	5.23	2 23 54.1	94
4	0 40 26.57	40 27.91	6 50 50.9	51 7.2	9.03163	0.1164	4.07	4.96	3 23 47.6	95
5	0 37 54.59	37 56.54	6 19 13.8	19 38.8	9.01328	0.1215	4.27	-4.23	4 23 41.1	96
6	0 35 30.42	35 32.86	5 47 29.6	48 2.8	8.98581	0.1198	4.39	+4.72	5 23 34.8	97
7	0 33 16.52	33 19.31	5 16 7.1	16 47.6	8.94868	0.1116	4.48	5.07	6 23 28.7	98
8	0 31 15.11	31 18.08	4 45 33.6	46 20.2	8.90045	0.0969	4.54	5.25	7 23 22.7	99
9	0 29 28.00	29 30.98	4 16 13.5	17 4.8	8.83907	0.0760	4.58	5.36	8 23 17.0	100
10	0 27 56.67	27 59.48	3 48 28.1	49 22.5	8.76090	0.0489	4.61	5.43	9 23 11.5	101
11	0 26 42.20	26 44.68	3 22 35.1	33 31.0	8.65947	0.0152	4.63	5.48	10 23 6.3	102
12	0 25 45.36	25 47.33	2 58 49.0	59 44.5	8.52152	9.9746	4.64	5.52	11 23 1.5	103
13	0 25 6.60	25 7.92	2 37 21.5	38 14.9	8.31308	9.9263	4.65	5.55	12 22 56.9	104
14	0 24 46.18	24 46.73	2 18 20.6	19 10.5	-7.89221	9.8691	4.65	5.56	13 22 52.6	105
15	0 24 44.09	24 43.76	2 1 52.1	2 37.2	+7.68705	9.8010	4.64	5.58	14 22 48.6	106
16	0 25 0.11	24 58.83	1 47 59.9	48 39.1	8.23906	9.7189	4.63	5.58	15 22 44.9	107
17	0 25 33.92	25 31.63	1 36 45.0	37 17.5	8.47064	9.6170	4.62	5.58	16 22 41.5	108
18	0 26 25.08	26 21.73	1 28 7.3	28 32.4	8.61722	9.4847	4.61	5.57	17 22 38.4	109
19	0 27 33.04	27 28.61	1 22 5.2	22 22.2	8.72336	9.2966	4.59	5.57	18 22 35.6	110
20	0 28 57.22	28 51.69	1 18 36.3	18 44.7	8.80576	-9.9671	4.57	5.56	19 22 33.1	111
21	0 30 37.00	30 30.38	1 17 37.1	17 36.6	8.87244	+8.0000	4.56	5.54	20 22 30.8	112
22	0 32 31.74	32 24.04	1 19 3.9	18 54.2	8.92800	9.0406	4.54	5.53	21 22 28.7	113
23	0 34 40.82	34 32.06	1 22 52.1	22 33.2	8.97527	9.3147	4.52	5.52	22 22 26.9	114
24	0 37 3.62	36 53.83	1 28 57.1	28 29.0	9.01611	9.4769	4.50	5.50	23 22 25.4	115
25	0 39 39.53	39 28.74	1 37 14.3	36 37.2	9.05194	9.5909	4.48	5.48	24 22 24.0	116
26	0 42 27.98	42 16.23	1 47 38.6	46 52.6	9.08352	9.6782	4.46	5.47	25 22 22.9	117
27	0 45 28.45	45 15.78	1 60 5.7	59 11.1	9.11186	9.7482	4.44	5.46	26 22 21.9	118
28	0 48 40.41	48 26.87	2 14 30.1	13 27.1	9.13732	9.8062	4.43	5.44	27 22 21.2	119
29	0 52 3.42	51 49.05	2 30 47.5	29 36.5	9.16052	9.8554	4.41	5.42	28 22 20.6	120
30	0 55 37.06	55 21.91	2 48 53.1	47 34.4	9.18171	9.8978	4.39	5.40	29 22 20.2	121
31	0 59 20.93	59 5.05	3 8 42.4	47 16.4	+9.20126	+9.9353	+4.38	+5.38	30 22 20.0	122



## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ .		Log. Coefficient of $t^2$ .		Mean Solar Time of Meridian Transit.	Sidereal Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
May	d. h. m. s.	m. s.	° ' "	' "					d. h. m.	d.
1	0 59 20.93	59 5.05	3 8 42.4	7 16.4	+9.20126	+9.9353	+4.38	+5.38	0 22 20.0	122
2	1 3 14.72	2 58.15	3 30 11.1	28 38.3	9.21938	9.9677	4.36	5.36	1 22 19.9	123
3	1 7 18.18	7 0.92	3 53 14.7	51 35.6	9.23632	9.9970	4.35	5.34	2 22 20.0	124
4	1 11 30.92	11 13.12	4 17 49.3	16 4.3	9.25222	0.0231	4.34	5.32	3 22 20.3	125
5	1 15 52.85	15 34.50	4 43 50.6	42 0.2	9.26719	0.0467	4.33	5.30	4 22 20.7	126
6	1 20 23.78	20 4.92	5 11 14.7	9 19.4	9.28155	0.0680	4.33	5.28	5 22 21.3	127
7	1 25 3.56	24 44.24	5 39 57.8	37 58.1	9.29521	0.0874	4.32	5.26	6 22 22.0	128
8	1 29 52.09	29 32.35	6 9 56.1	7 52.5	9.30835	0.1051	4.32	5.23	7 22 22.8	129
9	1 34 49.34	34 29.22	6 41 5.6	38 58.6	9.32105	0.1213	4.32	5.21	8 22 23.8	130
10	1 39 55.28	39 34.83	7 13 22.8	11 12.9	9.33339	0.1360	4.32	5.19	9 22 25.0	131
11	1 45 9.92	44 49.18	7 46 43.9	44 31.8	9.34544	0.1495	4.32	5.16	10 22 26.3	132
12	1 50 33.32	50 12.33	8 21 5.0	18 51.2	9.35725	0.1617	4.33	5.13	11 22 27.7	133
13	1 56 5.55	55 44.36	8 56 22.1	54 7.2	9.36887	0.1728	4.33	5.10	12 22 29.3	134
14	2 1 46.73	1 25.39	9 32 31.6	30 16.2	9.38035	0.1829	4.34	5.06	13 22 31.0	135
15	2 7 37.01	7 15.57	10 9 29.2	7 13.9	9.39172	0.1919	4.35	5.03	14 22 32.9	136
16	2 13 36.55	13 15.06	10 47 10.8	44 56.2	9.40302	0.1999	4.36	4.97	15 22 35.0	137
17	2 19 45.54	19 24.06	11 25 31.8	23 18.5	9.41427	0.2070	4.37	4.92	16 22 37.2	138
18	2 26 4.22	25 42.81	12 4 27.7	2 16.4	9.42554	0.2130	4.38	4.86	17 22 39.5	139
19	2 32 32.80	32 11.51	12 43 53.3	41 44.6	9.43682	0.2180	4.38	4.78	18 22 42.1	140
20	2 39 11.55	38 50.45	13 23 43.2	21 37.8	9.44806	0.2218	4.39	4.75	19 22 44.8	141
21	2 46 0.66	45 39.84	14 3 52.0	1 50.5	9.45923	0.2246	4.40	4.69	20 22 47.6	142
22	2 53 0.44	52 39.98	14 44 13.0	42 16.3	9.47037	0.2262	4.41	4.61	21 22 50.7	143
23	2 60 11.12	59 51.11	15 24 39.6	22 48.3	9.48147	0.2265	4.42	4.55	22 22 53.9	144
24	3 7 32.92	7 13.45	16 5 4.4	3 19.1	9.49249	0.2254	4.43	4.48	23 22 57.3	145
25	3 15 5.99	14 47.18	16 45 19.2	43 40.5	9.50335	0.2229	4.43	4.45	24 23 0.9	146
26	3 22 50.47	22 32.43	17 25 15.3	23 43.9	9.51406	0.2186	4.44	4.33	25 23 4.7	147
27	3 30 46.44	30 29.30	18 4 43.3	3 19.7	9.52451	0.2125	4.43	4.26	26 23 8.7	148
28	3 38 53.85	38 37.74	18 43 32.9	42 17.6	9.53462	0.2043	4.43	4.07	27 23 12.9	149
29	3 47 12.57	46 57.62	19 21 33.2	20 26.6	9.54438	0.1938	4.42	3.96	28 23 17.3	150
30	3 55 42.34	55 28.70	19 58 32.9	57 35.1	9.55362	0.1807	4.41	3.84	29 23 21.9	151
31	4 4 32.78	4 10.59	20 34 19.9	33 31.1	9.56228	0.1647	4.38	3.81	30 23 26.6	152
June 1	4 13 13.31	13 2.72	21 8 42.0	8 2.2	9.57025	0.1455	4.35	3.87	0 23 31.5	153
2	4 22 13.23	22 4.38	21 41 26.9	40 55.9	9.57744	0.1225	4.31	3.82	1 23 36.6	154
3	4 31 21.64	31 14.66	22 12 22.1	11 59.4	9.58373	0.0954	4.25	3.66	2 23 41.8	155
4	4 40 37.48	40 32.49	22 41 15.9	41 1.0	9.58906	0.0635	4.17	3.49	3 23 47.1	156
5	4 49 59.55	49 56.64	23 7 57.3	7 49.4	9.59333	0.0361	4.07	3.33	4 23 52.6	157
6	4 59 26.49	59 25.75	23 32 16.2	32 14.4	9.59651	0.0022	3.92	3.15	5 23 58.1	158
7	5 8 56.87	8 58.34	23 54 4.0	54 7.2	9.59854	0.9307	3.66	2.87	6 0 3.7	159
8	5 18 29.16	18 32.87	24 13 13.7	13 20.6	9.59940	0.8696	3.25	2.59	7 0 9.3	160
9	5 28 1.84	28 7.77	24 29 39.7	29 49.0	9.59910	0.7964	2.85	2.26	8 0 14.9	161
10	5 37 33.36	37 41.49	24 43 18.4	43 28.9	9.59763	0.7067	2.41	1.91	9 0 20.5	162
11	5 47 2.23	47 12.50	24 54 8.3	54 18.6	9.59505	0.5930	1.99	1.51	10 0 26.1	163
12	5 56 27.03	56 39.36	25 2 9.3	2 18.0	9.59140	0.4393	1.51	1.03	11 0 31.6	164
13	6 5 46.42	6 0.70	25 7 22.7	7 28.5	9.58673	0.3036	1.03	0.66	12 0 37.0	165
14	6 14 59.21	15 15.32	25 9 51.8	9 53.7	9.58111	0.1675	0.58	0.26	13 0 42.3	166
15	6 24 4.34	24 22.15	25 9 41.3	9 38.3	9.57462	0.0361	0.26	0.10	14 0 47.4	167
16	6 33 0.87	33 20.23	25 6 56.4	6 47.6	9.56732	0.2222	0.35	0.15	15 0 52.4	168
17	6 41 47.98	42 8.74	25 1 43.1	1 27.7	9.55927	0.4273	0.38	0.17	16 0 57.3	169
18	6 50 25.00	50 47.00	24 54 8.2	53 45.6	9.55055	0.5601	0.41	0.18	17 1 2.0	170
19	6 58 51.37	59 14.47	24 44 19.2	43 48.9	9.54121	0.6567	0.43	0.18	18 1 6.5	171
20	7 7 6.63	7 30.68	24 32 23.6	31 45.3	9.53130	0.7314	0.44	0.18	19 1 10.8	172
21	7 15 10.42	15 35.27	24 18 29.1	17 42.6	9.52088	0.7914	0.45	0.18	20 1 14.9	173
22	7 23 2.46	23 27.96	24 2 43.6	1 48.8	9.50997	0.8407	0.46	0.19	21 1 18.9	174
23	7 30 42.56	31 8.57	23 45 14.8	44 11.7	9.49862	0.8820	0.46	0.19	22 1 22.6	175
24	7 38 10.57	38 36.96	23 26 10.2	24 58.9	9.48686	0.9169	0.47	0.19	23 1 26.1	176
25	7 45 26.40	45 53.05	23 5 37.5	4 18.2	9.47470	0.9467	0.47	0.19	24 1 29.4	177
26	7 52 30.00	52 56.79	22 43 44.0	42 17.0	9.46214	0.9722	0.47	0.19	25 1 32.5	178
27	7 59 21.32	59 48.14	22 20 36.8	19 2.5	9.44918	0.9942	0.47	0.21	26 1 35.4	179
28	8 6 0.37	6 27.11	21 56 22.8	54 41.6	9.43582	0.0131	0.47	0.16	27 1 38.1	180
29	8 12 27.17	12 53.73	21 31 8.8	29 21.1	9.42207	0.0294	0.47	0.11	28 1 40.6	181
30	8 18 41.73	19 8.01	21 5 1.4	3 7.6	9.40788	0.0434	0.47	0.05	29 1 42.9	182
31	8 24 44.05	25 9.98	20 38 6.7	36 7.4	+9.39322	-0.0552	-4.47	-4.99	30 1 45.0	183



## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ .		Log. Coefficient of $t^2$ .		Mean Solar Time of Meridian Transit.	Side- real Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
d.	h. m. s.	m. s.	° ' "	' "					d. h. m.	d.
July 1	8 24 44.05	25 9.96	+20 38 6.7	36 7.4	+9.39322	-0.0552	-4.47	-4.99	1 1 45.0	183
2	8 30 34.16	30 59.65	20 10 31.0	8 26.3	9.37807	0.0652	4.47	4.92	2 1 46.9	184
3	8 36 12.06	36 37.03	19 42 20.4	40 11.8	9.36238	0.0734	4.47	4.84	3 1 48.6	185
4	8 41 37.75	42 2.12	19 13 40.7	11 28.3	9.34608	0.0800	4.47	4.75	4 1 50.0	186
5	8 46 51.22	47 14.92	18 44 37.7	42 22.3	9.32911	0.0851	4.47	4.61	5 1 51.3	187
6	8 51 52.44	52 15.38	18 15 17.0	12 59.1	9.31136	0.0888	4.48	4.43	6 1 52.3	188
7	8 56 41.27	57 3.43	17 45 44.3	43 24.7	9.29274	0.0911	4.48	4.12	7 1 53.2	189
8	9 1 17.70	1 39.01	17 16 5.0	13 44.3	9.27313	0.0920	4.48	-3.28	8 1 53.9	190
9	9 5 41.61	6 2.01	16 46 24.9	44 3.8	9.25240	0.0915	4.49	+4.05	9 1 54.3	191
10	9 9 52.86	10 12.29	16 16 49.5	14 28.7	9.23035	0.0896	4.49	4.39	10 1 54.5	192
11	9 13 51.27	14 9.67	15 47 24.4	45 4.7	9.20676	0.0863	4.50	4.59	11 1 54.6	193
12	9 17 36.63	17 53.95	15 18 15.4	15 57.5	9.18135	0.0816	4.50	4.62	12 1 54.3	194
13	9 21 8.70	21 24.90	14 49 28.2	47 12.8	9.15386	0.0754	4.51	4.82	13 1 53.9	195
14	9 24 27.23	24 42.96	14 21 8.8	18 56.5	9.12385	0.0675	4.52	4.91	14 1 53.3	196
15	9 27 31.90	27 45.72	13 53 23.1	51 14.8	9.09083	0.0579	4.53	4.98	15 1 52.4	197
16	9 30 22.38	30 34.95	13 26 17.6	24 13.9	9.05415	0.0463	4.54	5.05	16 1 51.3	198
17	9 32 58.30	33 9.58	12 59 58.7	58 0.4	9.01293	0.0325	4.56	5.11	17 1 49.9	199
18	9 35 19.24	35 29.21	12 34 33.2	32 40.9	8.96600	0.0163	4.57	5.16	18 1 48.3	200
19	9 37 24.77	37 33.42	12 10 7.8	8 22.2	8.91177	0.9973	4.58	5.21	19 1 46.4	201
20	9 39 14.45	39 21.76	11 46 49.9	45 11.6	8.84787	0.9752	4.59	5.25	20 1 44.3	202
21	9 40 47.82	40 53.79	11 24 47.0	23 16.5	8.77055	0.9493	4.61	5.29	21 1 41.9	203
22	9 42 4.41	42 9.05	11 4 6.6	2 44.4	8.67345	0.9190	4.62	5.33	22 1 39.2	204
23	9 43 3.76	43 7.09	10 44 56.3	43 43.0	8.54429	0.8833	4.63	5.37	23 1 36.2	205
24	9 43 45.41	43 47.47	10 27 24.4	26 20.2	8.35392	0.8409	4.64	5.41	24 1 33.0	206
25	9 44 8.96	44 9.81	10 11 38.9	10 44.0	+7.99556	0.7900	4.64	5.44	25 1 29.4	207
26	9 44 14.07	44 13.78	9 57 47.8	57 2.4	-7.47662	0.7278	4.65	5.47	26 1 25.6	208
27	9 44 0.47	43 59.14	9 45 59.2	45 23.1	8.20525	0.6499	4.65	5.50	27 1 21.4	209
28	9 43 28.01	43 25.75	9 36 20.5	53 53.5	8.46443	0.5487	4.66	5.52	28 1 16.9	210
29	9 42 36.68	42 35.61	9 28 59.1	28 40.8	8.62519	0.4086	4.65	5.54	29 1 12.1	211
30	9 41 26.64	41 22.93	9 24 1.4	23 51.2	8.74058	0.1892	4.64	5.56	30 1 7.0	212
Aug. 1	9 39 58.32	39 54.15	9 21 32.8	21 29.9	8.82924	-8.6947	4.62	5.58	31 1 1.6	213
2	9 38 12.39	38 7.94	9 21 37.4	21 40.7	8.89976	+8.7602	4.60	5.59	1 0 55.9	214
3	9 36 9.79	36 5.26	9 24 17.6	24 26.0	8.95673	0.2198	4.57	5.60	2 0 49.9	215
4	9 33 51.80	33 47.40	9 29 34.1	29 46.2	9.00277	0.4375	4.52	5.59	3 0 43.7	216
5	9 31 20.04	31 15.96	9 37 25.3	37 39.6	9.08946	0.5797	4.45	5.57	4 0 37.3	217
6	9 28 36.48	28 32.91	9 47 47.3	48 2.1	9.06774	0.6833	4.35	5.55	5 0 30.6	218
7	9 25 43.49	25 40.58	10 0 33.4	0 47.2	9.08809	0.7628	4.21	5.52	6 0 23.8	219
8	9 22 43.74	22 41.61	10 15 34.2	15 45.5	9.10088	0.8251	3.96	5.47	7 0 16.9	220
9	9 19 40.21	19 38.94	10 32 37.7	32 45.1	9.10595	0.8742	-3.09	5.41	8 0 9.9	221
10	9 16 36.17	16 35.79	10 51 29.2	51 31.7	9.10305	0.9125	+3.85	5.34	9 0 2.9	222
11	9 13 35.08	13 35.57	11 11 51.6	11 48.1	9.09163	0.9416	4.19	5.24	9 23 56.0	223
12	9 10 40.49	10 41.76	11 33 26.4	33 16.5	9.07093	0.9626	4.38	5.10	10 23 49.2	224
13	9 7 55.94	7 57.85	11 55 53.5	53 37.0	9.03960	0.9762	4.51	4.88	11 23 42.5	225
14	9 5 24.92	5 27.38	12 18 52.0	18 29.0	8.99552	0.9827	4.61	+4.37	12 23 36.1	226
15	9 3 10.79	3 13.38	12 42 0.4	41 81.5	8.93531	0.9824	4.68	-4.44	13 23 29.9	227
16	9 1 16.65	1 19.21	13 4 57.5	4 23.7	8.85317	0.9755	4.74	4.88	14 23 24.1	228
17	8 59 45.25	59 47.51	13 27 22.9	26 45.1	8.73770	0.9620	4.78	5.09	15 23 18.7	229
18	8 58 39.03	58 40.72	13 48 56.6	48 16.1	8.56188	0.9416	4.81	5.20	16 23 13.6	230
19	8 58 0.08	58 0.94	14 9 19.9	8 38.1	-8.22885	0.9132	4.84	5.31	17 23 9.1	231
20	8 57 50.04	57 49.83	14 28 15.1	27 33.6	+7.55387	0.8762	4.86	5.40	18 23 4.9	232
21	8 58 10.14	58 8.66	14 45 26.0	44 46.3	8.39479	0.8288	4.87	5.46	19 23 1.3	233
22	8 59 1.22	58 58.31	15 0 37.4	0 1.0	8.66889	0.7681	4.88	5.50	20 22 58.2	234
23	9 0 23.74	0 19.31	15 13 35.9	13 4.2	8.83486	0.6901	4.88	5.54	21 22 55.7	235
24	9 2 17.81	2 11.79	15 24 9.1	23 43.3	8.95523	0.5853	4.88	5.58	22 22 53.6	236
25	9 4 43.20	4 35.57	15 32 5.7	31 46.7	9.04826	0.4347	4.87	5.60	23 22 52.0	237
26	9 7 39.22	7 30.03	15 37 15.4	37 4.2	9.12271	0.1861	4.85	5.62	24 22 51.0	238
27	9 11 4.88	10 54.22	15 39 29.7	39 27.4	9.18429	+8.4701	4.83	5.64	25 22 50.5	239
28	9 14 59.08	14 47.07	15 38 42.1	38 48.8	9.23596	-8.9955	4.81	5.65	26 22 50.4	240
29	9 19 20.36	19 7.17	15 34 46.6	35 2.4	9.27963	0.3633	4.78	5.66	27 22 50.8	241
30	9 24 7.00	23 52.79	15 27 39.4	28 4.2	9.31661	0.5621	4.75	5.67	28 22 51.6	242
31	9 29 17.04	29 2.04	15 17 18.5	17 51.8	9.34802	0.6985	4.71	5.67	29 22 52.8	243
32	9 34 48.48	34 32.90	+15 3 43.7	4 25.0	+9.37466	-9.8015	+4.66	-5.66	30 22 54.4	244



FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.																
Day of Month.	Apparent Right Ascension.				Apparent Declination.				Log. Coefficient of <i>t</i> .		Log. Coefficient of <i>t</i> <sup>2</sup> .		Mean Solar Time of Meridian Transit.	Side-real Date of Transit.		
	At Mean Noon.		At Transit.		At Mean Noon.		At Transit.		In R.A.	In Dec.	In R.A.	In Dec.				
Sept. d.	h.	m.	s.	m.	s.	°	'	"	"					d. h. m.	d.	
1	9	40	39.13	40	23.19	+14	46	57.4	47	46.0	+9.39699	-9.8836	+4.60	-5.65	0 22 56.2	245
2	9	46	46.59	46	30.54	14	27	3.5	27	58.3	9.41546	9.9511	4.54	5.64	1 22 58.4	246
3	9	53	8.48	52	52.53	14	4	7.4	5	7.3	9.43062	0.0073	4.47	5.62	2 23 0.9	247
4	9	59	42.59	59	26.99	13	38	17.3	39	21.2	9.44293	0.0549	4.38	5.60	3 23 3.5	248
5	10	6	26.82	6	11.59	13	9	42.6	10	49.4	9.45267	0.0953	4.27	5.57	4 23 6.3	249
6	10	13	19.05	13	4.49	12	38	33.5	39	41.9	9.45997	0.1298	4.14	5.53	5 23 9.2	250
7	10	20	17.17	20	3.25	12	5	2.0	6	10.8	9.46504	0.1592	3.98	5.49	6 23 12.3	251
8	10	27	19.25	27	6.14	11	29	20.8	30	28.9	9.46842	0.1841	3.79	5.45	7 23 15.4	252
9	10	34	23.90	34	11.64	10	51	42.4	52	48.9	9.47041	0.2055	3.50	5.40	8 23 18.5	253
10	10	41	29.86	41	18.50	10	12	19.0	13	23.1	9.47109	0.2238	+1.68	5.35	9 23 21.6	254
11	10	48	35.89	48	25.49	9	31	22.6	32	23.6	9.47050	0.2392	-3.45	5.29	10 23 24.8	255
12	10	55	40.79	55	31.37	8	49	5.2	50	2.4	9.46898	0.2521	3.66	5.22	11 23 28.0	256
13	11	2	43.75	2	35.29	8	5	38.5	6	81.4	9.46669	0.2627	3.79	5.15	12 23 31.1	257
14	11	9	44.20	9	36.67	7	21	13.1	22	1.5	9.46382	0.2715	3.87	5.07	13 23 34.1	258
15	11	16	41.62	16	35.01	6	35	59.0	36	42.5	9.46044	0.2786	3.92	4.98	14 23 37.1	259
16	11	23	35.63	23	29.93	5	50	5.1	50	43.4	9.45672	0.2841	3.95	4.87	15 23 40.1	260
17	11	30	25.94	30	21.12	5	3	39.9	4	12.9	9.45281	0.2884	3.97	4.75	16 23 43.0	261
18	11	37	12.39	37	8.41	4	16	51.0	17	18.7	9.44871	0.2916	3.98	4.61	17 23 45.9	262
19	11	43	54.85	43	51.68	3	29	45.2	30	7.6	9.44442	0.2937	3.98	4.42	18 23 48.6	263
20	11	50	33.34	50	30.95	2	42	28.5	42	45.7	9.43999	0.2949	3.98	4.04	19 23 51.3	264
21	11	57	7.87	57	6.23	1	55	6.9	55	18.7	9.43555	0.2952	3.97	-2.68	20 23 54.0	265
22	12	3	38.51	3	37.57	1	7	45.2	7	51.8	9.43125	0.2950	3.96	+3.97	21 23 56.6	266
23	12	10	5.34	10	5.07	0	20	27.3	20	29.1	9.42706	0.2941	3.95	4.29	22 23 59.0	267
24	12	16	38.49	16	28.87	0	26	42.5	26	45.5	9.42299	0.2925	3.93	4.46	24 0 1.5	268
25	12	22	48.13	22	49.14	1	13	40.3	13	48.0	9.41906	0.2904	3.91	4.57	25 0 3.9	269
26	12	29	4.41	29	6.03	2	0	22.3	0	34.6	9.41529	0.2879	3.89	4.64	26 0 6.2	270
27	12	35	17.51	35	19.71	2	46	46.4	47	2.8	9.41170	0.2848	3.86	4.68	27 0 8.5	271
28	12	41	27.62	41	30.37	3	32	50.2	33	10.7	9.40829	0.2814	3.83	4.72	28 0 10.7	272
29	12	47	34.91	47	38.19	4	18	31.8	18	56.3	9.40507	0.2777	3.80	4.77	29 0 12.9	273
30	12	53	39.57	53	43.36	5	3	48.6	4	16.8	9.40204	0.2735	3.77	4.82	30 0 15.0	274
Oct. 1	12	59	41.79	59	46.08	5	48	37.6	49	9.4	9.39921	0.2689	3.74	4.86	1 0 17.1	275
2	13	5	41.73	5	46.52	6	32	57.6	33	32.9	9.39658	0.2640	3.70	4.88	2 0 19.2	276
3	13	11	39.58	11	44.84	7	16	46.9	17	25.5	9.39414	0.2588	3.65	4.89	3 0 21.2	277
4	13	17	35.50	17	41.22	8	0	4.2	0	45.7	9.39190	0.2530	3.61	4.91	4 0 23.2	278
5	13	23	29.67	23	35.84	8	42	47.6	43	32.0	9.38988	0.2475	3.58	4.93	5 0 25.1	279
6	13	29	22.26	29	28.86	9	24	55.9	25	43.2	9.38797	0.2413	3.55	4.94	6 0 27.1	280
7	13	35	13.36	35	20.41	10	6	27.8	7	17.7	9.38620	0.2340	3.51	4.96	7 0 29.0	281
8	13	41	3.06	41	10.59	10	47	22.1	48	14.4	9.38462	0.2281	3.45	4.97	8 0 30.9	282
9	13	46	51.65	46	59.60	11	27	37.3	28	31.8	9.38332	0.2209	3.39	4.98	9 0 32.8	283
10	13	52	39.27	52	47.61	12	7	11.8	8	8.4	9.38212	0.2133	3.36	5.00	10 0 34.6	284
11	13	58	25.93	58	34.68	12	46	4.8	47	3.3	9.38092	0.2054	3.33	5.01	11 0 36.5	285
12	14	4	11.65	4	20.83	13	24	15.0	25	15.3	9.37979	0.1973	3.30	5.02	12 0 38.3	286
13	14	9	56.50	10	6.09	14	1	41.4	2	43.3	9.37879	0.1887	3.26	5.04	13 0 40.1	287
14	14	15	40.61	15	50.61	14	38	22.5	39	25.8	9.37788	0.1796	3.22	5.05	14 0 41.9	288
15	14	21	24.04	21	34.45	15	14	16.9	15	21.5	9.37705	0.1701	3.17	5.06	15 0 43.7	289
16	14	27	6.83	27	17.65	15	49	23.5	50	29.2	9.37629	0.1599	3.13	5.07	16 0 45.5	290
17	14	32	49.04	33	0.25	16	23	40.7	24	47.3	9.37552	0.1495	3.19	5.09	17 0 47.2	291
18	14	38	30.62	38	42.23	16	57	7.3	58	14.7	9.37465	0.1384	3.24	5.10	18 0 49.0	292
19	14	44	11.51	44	23.50	17	29	42.1	30	50.0	9.37372	0.1267	3.25	5.11	19 0 50.7	293
20	14	49	51.64	50	4.00	18	1	23.5	2	31.7	9.37273	0.1143	3.29	5.12	20 0 52.4	294
21	14	55	30.95	55	43.68	18	32	10.2	33	18.5	9.37162	0.1013	3.35	5.13	21 0 54.1	295
22	15	1	9.34	1	22.46	19	2	0.4	3	8.7	9.37034	0.0874	3.40	5.14	22 0 55.9	296
23	15	6	46.68	7	0.12	19	30	52.5	32	0.5	9.36888	0.0726	3.47	5.16	23 0 57.5	297
24	15	12	22.79	12	36.55	19	58	45.1	59	52.5	9.36714	0.0569	3.54	5.17	24 0 59.1	298
25	15	17	57.46	18	11.55	20	25	36.3	26	42.9	9.36511	0.0401	3.61	5.18	25 1 0.8	299
26	15	23	30.44	23	44.82	20	51	24.3	52	29.9	9.36264	0.0221	3.68	5.19	26 1 2.4	300
27	15	29	1.41	29	16.06	21	16	7.3	17	11.7	9.35981	0.0028	3.75	5.21	27 1 4.0	301
28	15	34	30.01	34	44.89	21	39	43.3	40	46.1	9.35641	0.9818	3.83	5.22	28 1 5.5	302
29	15	39	55.82	40	10.90	22	2	10.4	3	11.3	9.35235	0.9593	3.90	5.23	29 1 7.0	303
30	15	45	18.36	45	33.59	22	23	26.6	24	25.4	9.34755	0.9348	3.96	5.24	30 1 8.4	304
31	15	50	37.06	50	52.39	22	43	29.5	44	25.9	9.34186	0.9079	4.03	5.26	31 1 9.8	305
32	15	55	51.26	56	6.63	-23	2	16.6	3	10.2	+9.33512	-9.8781	-4.10	+5.28	32 1 11.1	306



## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of t.		Log. Coefficient of t <sup>2</sup> .		Mean Solar Time of Meridian Transit.	Sidereal Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
d.	h. m. s.	m. s.	° ' "	° ' "					d. h. m.	d.
Nov. 1	15 55 51.26	56 6.68	23 2 16.6	3 10.2	+9.33512	-9.8781	-4.10	+5.28	1 1 11.1	306
2	16 1 0.22	1 15.56	23 19 45.3	20 35.8	9.32712	9.8450	4.17	5.29	2 1 12.3	307
3	16 6 3.06	6 18.30	23 35 53.2	36 40.3	9.31761	9.8082	4.23	5.30	3 1 13.4	308
4	16 10 58.77	11 13.82	23 50 37.9	51 21.3	9.30628	9.7666	4.30	5.31	4 1 14.4	309
5	16 15 46.23	16 0.96	24 3 56.5	4 35.8	9.29283	9.7187	4.36	5.33	5 1 15.1	310
6	16 20 24.17	20 38.49	24 15 45.6	16 20.4	9.27680	9.6626	4.42	5.35	6 1 15.8	311
7	16 24 51.14	25 4.94	24 26 2.0	26 32.0	9.25752	9.5960	4.48	5.36	7 1 16.4	312
8	16 29 5.47	29 18.59	24 34 42.3	35 7.2	9.23428	9.5136	4.54	5.38	8 1 16.6	313
9	16 33 5.30	33 17.60	24 41 42.9	42 2.3	9.20589	9.4076	4.60	5.40	9 1 16.7	314
10	16 36 48.58	36 59.90	24 46 59.4	47 13.1	9.17152	9.2598	4.66	5.41	10 1 16.5	315
11	16 40 13.02	40 23.19	24 50 27.4	50 35.2	9.12851	9.0204	4.71	5.43	11 1 15.9	316
12	16 43 16.05	43 24.90	24 52 2.4	52 4.0	9.07406	-8.3870	4.76	5.45	12 1 14.9	317
13	16 45 54.88	46 2.23	24 51 39.2	51 34.6	9.00826	+8.7782	4.81	5.48	13 1 13.6	318
14	16 48 6.54	48 12.26	24 49 10.9	49 0.0	8.90729	9.1743	4.86	5.50	14 1 11.9	319
15	16 49 47.86	49 51.90	24 44 30.5	44 13.4	8.76775	9.3862	4.91	5.52	15 1 9.6	320
16	16 50 55.60	50 57.84	24 37 31.1	37 8.1	8.53321	9.5344	4.95	5.54	16 1 6.7	321
17	16 51 26.53	51 26.97	24 28 5.6	27 37.1	+7.87647	9.6500	4.98	5.57	17 1 3.3	322
18	16 51 17.64	51 16.35	24 16 6.4	15 33.3	-8.32323	9.7452	5.01	5.59	18 0 59.2	323
19	16 50 26.29	50 23.47	24 1 25.2	0 48.6	8.70920	9.8268	5.03	5.61	19 0 54.3	324
20	16 48 50.58	48 46.53	23 43 55.1	43 16.5	8.91529	9.8976	5.04	5.62	20 0 48.8	325
21	16 46 29.69	46 24.85	23 23 31.7	23 53.0	9.05475	9.9593	5.03	5.62	21 0 42.5	326
22	16 43 24.22	43 19.11	23 60 14.5	59 38.0	9.15700	0.0125	5.01	5.61	22 0 35.5	327
23	16 39 36.58	39 31.81	22 34 8.8	33 37.1	9.23371	0.0576	4.96	5.57	23 0 27.8	328
24	16 35 11.20	35 7.39	22 5 27.8	5 3.6	9.29041	0.0939	4.87	5.50	24 0 19.5	329
25	16 30 14.72	30 12.43	21 34 34.9	34 20.7	9.32991	0.1209	4.73	5.37	25 0 10.7	330
26	16 24 55.75	24 55.41	21 2 4.8	2 2.6	9.35367	0.1376	4.46	+5.10	26 0 1.5	331
27	16 19 24.48	19 26.27	20 28 42.6	28 53.4	9.36235	0.1431	-3.35	-3.58	26 23 59.2	332
28	16 13 52.32	13 56.16	19 55 21.6	55 45.1	9.35827	0.1364	+4.39	5.16	27 23 42.8	333
29	16 8 30.29	8 36.03	19 23 0.1	23 34.7	9.33540	0.1163	4.70	5.45	28 23 33.5	334
30	16 3 28.91	3 35.96	18 52 36.3	53 19.1	9.29869	0.0817	4.85	5.61	29 23 24.6	335
Dec. 1	15 58 57.18	59 4.92	18 25 3.1	25 50.2	9.24520	0.0309	4.94	5.71	0 23 16.1	336
2	15 55 2.13	55 9.85	18 1 2.3	1 49.9	9.17232	9.9617	5.00	5.77	1 23 8.3	337
3	15 51 48.61	51 55.64	17 41 4.6	41 48.3	9.07522	9.8695	5.03	5.80	2 23 1.2	338
4	15 49 19.35	49 25.13	17 25 27.6	26 4.3	8.94385	9.7463	5.03	5.81	3 22 54.8	339
5	15 47 35.18	47 39.25	17 14 16.9	14 43.8	8.75284	9.5736	5.03	5.80	4 22 49.1	340
6	15 46 35.57	46 37.66	17 7 26.6	7 42.0	-8.52311	9.2970	5.01	5.78	5 22 44.1	341
7	15 46 18.75	46 18.61	17 4 43.9	4 46.9	+7.38941	+8.5175	4.99	5.74	6 22 39.8	342
8	15 46 42.26	46 39.85	17 5 49.5	5 40.0	8.46885	-9.0709	4.95	5.69	7 22 36.2	343
9	15 47 43.15	47 38.50	17 10 21.0	9 59.4	8.73496	9.4019	4.92	5.64	8 22 33.3	344
10	15 49 18.33	49 11.53	17 17 55.0	17 22.3	8.88667	9.5890	4.87	5.58	9 22 30.9	345
11	15 51 24.66	51 15.85	17 28 6.6	27 24.0	8.98942	9.6739	4.83	5.51	10 22 29.1	346
12	15 53 59.07	53 48.40	17 40 32.3	39 41.1	9.06488	9.7460	4.78	5.43	11 22 27.7	347
13	15 56 58.74	56 46.40	17 54 49.8	53 51.4	9.12293	9.7978	4.73	5.34	12 22 26.7	348
14	16 0 21.00	0 7.17	18 10 38.5	9 34.4	9.16902	9.8353	4.69	5.24	13 22 26.0	349
15	16 4 3.47	3 48.35	18 27 39.5	26 31.1	9.20647	9.8625	4.64	5.12	14 22 25.8	350
16	16 8 4.04	7 47.84	18 45 35.5	44 24.0	9.23748	9.8816	4.59	4.98	15 22 25.9	351
17	16 12 20.81	12 3.64	19 4 11.2	2 57.8	9.26342	9.8943	4.54	4.80	16 22 26.2	352
18	16 16 52.01	16 34.03	19 23 13.1	21 58.8	9.28535	9.9021	4.49	4.55	17 22 26.7	353
19	16 21 36.16	21 17.55	19 42 29.5	41 15.1	9.30415	9.9056	4.45	-3.95	18 22 27.5	354
20	16 26 31.96	26 12.85	20 1 49.7	0 36.1	9.32042	9.9052	4.40	+4.15	19 22 28.5	355
21	16 31 38.25	31 18.76	20 21 4.2	19 52.2	9.33458	9.9014	4.36	4.53	20 22 29.7	356
22	16 36 54.02	36 34.25	20 40 4.7	38 54.8	9.34702	9.8947	4.31	4.71	21 22 31.1	357
23	16 42 18.39	41 58.44	20 58 43.8	57 36.5	9.35802	9.8851	4.27	4.83	22 22 32.4	358
24	16 47 50.61	47 30.56	21 16 55.0	15 50.7	9.36780	9.8728	4.23	4.91	23 22 34.0	359
25	16 53 29.96	53 9.91	21 34 32.6	33 31.7	9.37654	9.8579	4.19	4.97	24 22 35.7	360
26	16 59 15.83	58 55.86	21 51 31.4	50 34.2	9.38441	9.8408	4.16	5.02	25 22 37.5	361
27	17 5 7.72	4 47.88	22 7 46.8	6 53.4	9.39154	9.8200	4.12	5.06	26 22 39.4	362
28	17 11 5.16	10 45.52	22 23 14.8	22 25.4	9.39802	9.7969	4.09	5.09	27 22 41.4	363
29	17 17 7.72	16 48.37	22 37 51.7	37 6.4	9.40393	9.7707	4.06	5.12	28 22 43.6	364
30	17 23 15.04	22 56.01	22 51 34.0	50 52.9	9.40936	9.7411	4.03	5.14	29 22 45.8	365
31	17 29 26.78	29 8.09	23 4 18.8	3 41.9	9.41434	9.7076	4.00	5.16	30 22 48.0	366
32	17 35 42.64	35 24.35	23 16 3.4	15 30.7	+9.41894	-9.6696	+3.97	+5.18	31 22 50.3	367



FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.																		
Day of Month.	Apparent Right Ascension.				Apparent Declination.				Log. Factor <i>t</i> .		Log. Factor <i>t</i> <sup>2</sup> .		Mean Solar Time of Meridian Transit.	Sidereal Date of Transit.				
	At Mean Noon.		At Transit.		At Mean Noon.		At Transit.		In R.A.	In Dec.	In R.A.	In Dec.						
d.	h.	m.	s.	m.	s.	°	'	"					d.	h.	m.	d.		
Jan. 1	20	27	5.62	27	28.29	20	49	33.1	48	17.9	+9.33508	+9.8554	-3.50	+4.93	1	1 44.8	0	
2	20	32	16.45	32	39.31	20	39	3.4	30	44.6	9.33330	9.8701	3.50	4.92	2	1 46.1	1	
3	20	37	25.96	37	48.97	20	13	58.4	12	36.1	9.33189	9.8841	3.51	4.91	3	1 47.3	2	
4	20	42	34.14	42	57.29	19	55	18.7	53	53.0	9.32949	9.8974	3.51	4.91	4	1 48.4	3	
5	20	47	40.97	48	4.37	19	36	4.8	34	35.7	9.32762	9.9103	3.53	4.90	5	1 49.6	4	
6	20	52	46.45	53	9.89	19	16	17.3	14	44.8	9.32563	9.9223	3.53	4.88	6	1 50.7	5	
7	20	57	50.56	58	14.14	18	55	57.2	54	21.1	9.32368	9.9338	3.53	4.87	7	1 51.9	6	
8	21	2	53.29	3	16.99	18	35	5.3	33	25.7	9.32170	9.9447	3.53	4.86	8	1 53.0	7	
9	21	7	54.64	8	18.46	18	13	42.3	11	59.3	9.31972	9.9552	3.53	4.85	9	1 54.1	8	
10	21	12	54.61	13	18.55	17	51	48.8	50	2.4	9.31769	9.9651	3.51	4.84	10	1 55.2	9	
11	21	17	53.20	18	17.24	17	29	25.6	27	35.9	9.31574	9.9745	3.52	4.82	11	1 56.2	10	
12	21	22	50.44	23	14.58	17	6	33.5	4	40.5	9.31372	9.9836	3.51	4.81	12	1 57.2	11	
13	21	27	46.31	28	10.54	16	43	13.2	41	17.0	9.31173	9.9922	3.50	4.80	13	1 58.2	12	
14	21	32	40.83	33	5.14	16	19	25.6	17	26.3	9.30978	0.0004	3.51	4.79	14	1 59.1	13	
15	21	37	34.02	37	58.41	15	55	11.4	53	9.0	9.30777	0.0082	3.50	4.78	15	2 0.1	14	
16	21	42	25.87	42	50.34	15	30	31.4	28	25.8	9.30582	0.0158	3.50	4.76	16	2 1.0	15	
17	21	47	16.41	47	40.96	15	5	26.0	3	17.5	9.30388	0.0228	3.49	4.75	17	2 1.9	16	
18	21	52	5.64	52	30.26	14	39	56.6	37	45.0	9.30191	0.0296	3.48	4.73	18	2 2.8	17	
19	21	56	53.60	57	18.28	14	14	3.8	11	49.3	9.30009	0.0360	3.47	4.72	19	2 3.7	18	
20	22	1	40.31	2	5.05	13	47	48.3	45	31.0	9.29813	0.0422	3.47	4.71	20	2 4.5	19	
21	22	6	25.78	6	50.57	13	21	10.9	18	50.9	9.29626	0.0480	3.47	4.69	21	2 5.3	20	
22	22	11	10.03	11	34.87	12	54	12.5	51	49.8	9.29441	0.0536	3.45	4.68	22	2 6.1	21	
23	22	15	53.08	16	17.97	12	26	53.8	24	28.5	9.29257	0.0588	3.44	4.65	23	2 6.9	22	
24	22	20	34.95	20	59.88	11	59	15.7	56	47.8	9.29078	0.0638	3.42	4.63	24	2 7.6	23	
25	22	25	15.68	25	40.66	11	31	18.9	28	48.5	9.28906	0.0685	3.42	4.61	25	2 8.4	24	
26	22	29	55.30	30	20.32	11	3	4.3	0	31.5	9.28732	0.0730	3.41	4.59	26	2 9.1	25	
27	22	34	33.81	34	58.86	10	34	32.6	31	57.5	9.28559	0.0772	3.39	4.57	27	2 9.8	26	
28	22	39	11.24	39	36.32	10	5	44.8	3	7.4	9.28396	0.0812	3.38	4.54	28	2 10.5	27	
29	22	43	47.64	44	12.77	9	36	41.6	34	2.0	9.28236	0.0849	3.37	4.53	29	2 11.2	28	
30	22	48	23.03	48	48.19	9	7	23.9	4	42.2	9.28078	0.0884	3.36	4.50	30	2 11.8	29	
31	22	52	57.44	53	22.63	8	37	52.3	35	8.7	9.27925	0.0917	3.34	4.47	31	2 12.4	30	
Feb. 1	22	57	30.90	57	56.11	8	8	7.6	5	22.1	9.27779	0.0945	3.33	4.44	32	2 13.0	31	
2	23	2	3.45	2	28.69	7	38	10.7	35	33.3	9.27634	0.0977	3.30	4.41	33	2 13.6	32	
3	23	6	35.12	7	0.40	7	8	2.3	5	13.1	9.27499	0.1003	3.29	4.38	34	2 14.2	33	
4	23	11	5.96	11	31.27	6	37	43.2	34	52.3	9.27367	0.1028	3.23	4.34	35	2 14.8	34	
5	23	15	36.00	16	1.36	6	7	14.1	4	21.6	9.27244	0.1050	3.25	4.33	36	2 15.4	35	
6	23	20	5.29	20	30.67	5	36	35.9	33	41.8	9.27123	0.1071	3.21	4.27	37	2 15.9	36	
7	23	24	33.84	24	59.34	5	5	49.1	2	53.6	9.27008	0.1091	3.19	4.22	38	2 16.4	37	
8	23	29	1.71	29	27.14	4	34	54.5	31	57.7	9.26900	0.1108	3.14	4.19	39	2 16.9	38	
9	23	33	28.94	33	54.41	4	3	53.0	0	54.9	9.26802	0.1124	3.13	4.11	40	2 17.4	39	
10	23	37	55.58	38	21.09	3	32	43.1	29	45.9	9.26706	0.1137	3.10	4.07	41	2 17.9	40	
11	23	42	21.65	42	47.20	3	1	31.7	58	31.4	9.26616	0.1149	3.04	3.99	42	2 18.4	41	
12	23	46	47.20	47	12.79	2	30	13.4	27	12.0	9.26536	0.1160	3.03	3.91	43	2 18.9	42	
13	23	51	12.28	51	37.92	1	58	51.0	55	48.6	9.26461	0.1168	2.96	3.86	44	2 19.4	43	
14	23	55	36.92	56	2.61	1	27	25.2	24	21.9	9.26393	0.1175	2.93	3.68	45	2 19.9	44	
15	0	0	1.17	0	26.90	0	55	56.7	52	52.6	9.26331	0.1181	2.86	3.46	46	2 20.3	46	
16	0	4	25.06	4	50.85	-	0	24	26.3	21	21.4	9.26278	0.1184	2.86	+2.99	47	2 20.8	47
17	0	8	48.65	9	14.50	+	0	7	5.3	10	10.9	9.26228	0.1186	2.79	-2.68	48	2 21.3	48
18	0	13	11.94	13	37.87	0	38	37.4	41	43.6	9.26186	0.1187	2.68	3.47	49	2 21.7	49	
19	0	17	35.00	18	0.97	1	10	9.8	13	15.9	9.26148	0.1184	2.59	3.59	50	2 22.1	50	
20	0	21	57.85	22	23.87	1	41	39.9	44	47.1	9.26118	0.1182	2.46	3.76	51	2 22.6	51	
21	0	26	20.54	26	46.62	2	13	8.9	16	16.4	9.26095	0.1176	2.29	3.86	52	2 23.0	52	
22	0	30	43.11	31	9.25	2	44	35.4	47	43.2	9.26077	0.1170	1.99	3.99	53	2 23.4	53	
23	0	35	5.59	35	51.80	3	15	58.8	19	6.8	9.26067	0.1162	-1.68	4.05	54	2 23.8	54	
24	0	39	28.03	39	54.32	3	47	18.3	50	26.5	9.26062	0.1153	+1.68	4.13	55	2 24.3	55	
25	0	43	50.45	44	16.82	4	18	33.2	21	41.4	9.26065	0.1140	1.68	4.17	56	2 24.7	56	
26	0	48	12.89	48	39.34	4	49	42.5	52	50.7	9.26067	0.1126	2.16	4.21	57	2 25.2	57	
27	0	52	35.36	53	1.90	5	20	45.5	23	53.6	9.26072	0.1112	2.46	4.26	58	2 25.6	58	
28	0	56	57.89	57	24.51	5	51	41.7	54	49.6	9.26089	0.1095	2.59	4.31	59	2 26.0	59	
29	1	1	20.54	1	47.25	6	22	30.3	25	37.9	9.26113	0.1078	2.59	4.33	60	2 26.4	60	
30	1	5	43.35	6	10.16	6	53	10.5	56	17.8	9.26138	0.1055	2.68	4.36	61	2 26.9	61	
31	1	10	6.32	10	33.23	+	7	23	41.7	26	48.6	+9.26171	+0.1033	+2.72	-4.39	62	2 27.3	62



## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Factor 1.		Log. Factor 2.		Mean Solar Time of Meridian Transit.		Side-Real Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.	d. h. m.	d.	
Mar. 1	1 5 43.35	6 10.16	+ 6 53 10.5	56 17.8	+9.26138	+0.1055	+2.68	-4.36	d. h. m.	d.	
2	1 10 6.32	10 33.23	7 23 41.7	26 48.6	9.26171	0.1033	2.72	4.39	61 2 26.9	61	
3	1 14 29.50	14 56.50	7 54 3.2	57 9.5	9.26204	0.1009	2.83	4.43	63 2 27.7	63	
4	1 18 52.91	19 30.02	8 24 14.3	27 20.0	9.26249	0.0983	2.86	4.46	64 2 28.1	64	
5	1 23 16.60	23 43.83	8 54 14.2	57 19.4	9.26297	0.0955	2.91	4.48	65 2 28.6	65	
6	1 27 40.59	28 7.94	9 24 3.2	27 6.8	9.26349	0.0925	2.93	4.51	66 2 29.0	66	
7	1 32 4.92	32 32.38	9 53 37.5	56 41.3	9.26407	0.0894	2.96	4.52	67 2 29.5	67	
8	1 36 29.61	36 57.20	10 22 59.6	26 2.4	9.26467	0.0860	3.01	4.54	68 2 30.0	68	
9	1 40 54.69	41 22.42	10 52 7.9	55 9.7	9.26533	0.0825	3.04	4.56	69 2 30.5	69	
10	1 45 20.19	45 48.06	11 21 1.7	24 2.5	9.26607	0.0788	3.04	4.59	70 2 31.0	70	
11	1 49 46.15	50 14.16	11 49 40.2	52 40.1	9.26682	0.0748	3.06	4.60	71 2 31.5	71	
12	1 54 12.57	54 40.72	12 18 2.7	21 1.5	9.26758	0.0707	3.10	4.62	72 2 32.0	72	
13	1 58 39.48	59 7.77	12 46 8.5	49 6.1	9.26841	0.0663	3.10	4.64	73 2 32.5	73	
14	2 3 6.92	3 35.37	13 13 57.0	16 53.3	9.26931	0.0617	3.11	4.65	74 2 33.0	74	
15	2 7 34.92	8 3.52	13 41 27.5	44 22.4	9.27020	0.0569	3.14	4.67	75 2 33.5	75	
16	2 12 3.47	12 32.23	14 8 39.3	11 32.7	9.27112	0.0518	3.16	4.68	76 2 34.0	76	
17	2 16 32.60	17 1.53	14 35 31.7	38 23.6	9.27210	0.0465	3.16	4.70	77 2 34.6	77	
18	2 21 2.34	21 31.43	15 2 4.1	4 54.4	9.27308	0.0409	3.16	4.71	78 2 35.1	78	
19	2 25 32.69	26 1.95	15 28 15.7	31 4.4	9.27403	0.0351	3.16	4.72	79 2 35.7	79	
20	2 30 3.65	30 13.50	15 54 5.9	56 52.9	9.27507	0.0291	3.18	4.74	80 2 36.3	80	
21	2 34 35.25	35 4.88	16 19 34.1	22 19.3	9.27605	0.0226	3.18	4.75	81 2 36.9	81	
22	2 39 7.47	39 37.28	16 44 39.5	47 22.8	9.27709	0.0160	3.19	4.76	82 2 37.5	82	
23	2 43 40.34	44 10.34	17 9 21.5	12 2.8	9.27812	0.0091	3.19	4.78	83 2 38.1	83	
24	2 48 13.85	48 44.03	17 33 39.4	36 18.5	9.27912	0.0018	3.18	4.79	84 2 38.7	84	
25	2 52 47.99	53 18.35	17 57 32.4	0 9.3	9.28012	0.9940	3.16	4.80	85 2 39.3	85	
26	2 57 22.75	57 53.29	18 20 59.8	23 34.4	9.28108	9.9861	3.16	4.80	86 2 39.9	86	
27	3 1 58.12	2 28.86	18 44 1.2	46 33.6	9.28203	9.9779	3.14	4.81	87 2 40.6	87	
28	3 6 34.09	7 5.02	19 6 36.0	9 6.0	9.28301	9.9692	3.13	4.82	88 2 41.2	88	
29	3 11 10.67	11 41.80	19 28 43.4	31 10.9	9.28395	9.9601	3.11	4.82	89 2 41.9	89	
30	3 15 47.84	16 19.17	19 50 22.8	52 47.8	9.28484	9.9507	3.10	4.85	90 2 42.6	90	
31	3 20 25.57	20 57.10	20 11 33.7	13 56.0	9.28570	9.9408	3.08	4.85	91 2 43.3	91	
Apr. 1	3 25 3.84	25 35.56	20 32 15.4	34 34.9	9.28654	9.9306	3.08	4.86	92 2 44.0	92	
2	3 29 42.64	30 14.56	20 52 27.5	54 44.2	9.28735	9.9198	3.04	4.86	93 2 44.7	93	
3	3 34 21.94	34 54.05	21 12 9.3	14 23.1	9.28810	9.9086	3.03	4.87	94 2 45.4	94	
4	3 39 1.71	39 34.01	21 31 20.3	33 31.1	9.28881	9.8969	3.01	4.88	95 2 46.1	95	
5	3 43 41.93	44 14.42	21 50 0.1	52 7.8	9.28948	9.8847	2.99	4.89	96 2 46.8	96	
6	3 48 22.57	48 55.26	22 8 8.2	10 12.8	9.29018	9.8719	2.91	4.89	97 2 47.6	97	
7	3 53 3.61	53 36.50	22 25 44.1	27 45.5	9.29070	9.8586	2.86	4.90	98 2 48.4	98	
8	3 57 44.99	58 18.05	22 42 47.4	44 45.5	9.29118	9.8447	2.86	4.91	99 2 49.1	99	
9	4 2 26.68	2 59.92	22 59 17.6	1 12.2	9.29169	9.8301	2.76	4.91	100 2 49.8	100	
10	4 7 8.67	7 42.10	23 15 14.2	17 5.3	9.29212	9.8145	2.64	4.91	101 2 50.6	101	
11	4 11 50.91	12 24.52	23 30 36.6	32 24.2	9.29243	9.7985	2.59	4.92	102 2 51.4	102	
12	4 16 33.34	17 7.13	23 45 24.8	47 8.8	9.29272	9.7817	2.38	4.93	103 2 52.2	103	
13	4 21 15.93	21 49.89	23 59 38.4	1 18.7	9.29292	9.7640	+1.99	4.93	104 2 53.0	104	
14	4 25 58.62	26 32.75	24 13 16.9	14 53.4	9.29303	9.7452	-1.68	4.94	105 2 53.8	105	
15	4 30 41.35	31 15.61	24 26 19.9	27 52.4	9.29304	9.7254	2.29	4.94	106 2 54.5	106	
16	4 35 24.06	35 58.45	24 38 47.2	40 15.7	9.29295	9.7047	2.46	4.94	107 2 55.2	107	
17	4 40 6.69	40 41.23	24 50 38.7	52 3.2	9.29281	9.6828	2.68	4.94	108 2 56.0	108	
18	4 44 49.19	45 23.85	25 1 54.2	3 14.6	9.29255	9.6595	2.81	4.95	109 2 56.7	109	
19	4 49 31.49	50 6.28	25 12 33.2	13 49.4	9.29220	9.6345	2.91	4.95	110 2 57.5	110	
20	4 54 13.52	54 48.42	25 22 35.4	23 47.3	9.29174	9.6077	3.03	4.95	111 2 58.3	111	
21	4 58 55.30	59 30.19	25 32 0.6	33 8.3	9.29112	9.5796	3.10	4.95	112 2 59.0	112	
22	5 3 36.44	4 11.51	25 40 49.1	41 52.5	9.29035	9.5493	3.14	4.95	113 2 59.7	113	
23	5 8 17.15	8 52.31	25 49 0.6	49 59.6	9.28951	9.5163	3.21	4.95	114 3 0.5	114	
24	5 12 57.27	13 32.48	25 56 34.8	57 29.3	9.28852	9.4806	3.26	4.95	115 3 1.2	115	
25	5 17 36.71	18 11.97	26 3 31.8	4 21.9	9.28742	9.4423	3.33	4.95	116 3 1.9	116	
26	5 22 15.38	22 50.67	26 9 51.9	10 37.4	9.28613	9.3996	3.36	4.95	117 3 2.6	117	
27	5 26 53.17	27 28.48	26 15 34.8	16 15.8	9.28467	9.3525	3.40	4.95	118 3 3.3	118	
28	5 31 30.00	32 5.31	26 20 40.6	21 17.0	9.28309	9.3000	3.45	4.95	119 3 4.0	119	
29	5 36 5.77	36 41.05	26 25 9.5	25 41.3	9.28134	9.2403	3.48	4.94	120 3 4.6	120	
30	5 40 40.37	41 15.63	26 29 1.6	29 28.8	9.27941	9.1714	3.51	4.94	121 3 5.3	121	
31	5 45 13.71	45 48.92	+26 32 17.1	32 39.7	+9.27734	+9.0896	-3.54	-4.94	122 3 5.9	122	



FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.													
Day of Month.	Apparent Right Ascension.			Apparent Declination.			Log. Factor 1.		Log. Factor 2.		Mean Solar Time of Meridian Transit.		
	At Mean Noon.		At Transit.	At Mean Noon.		At Transit.	In R.A.	In Dec.	In R.A.	In Dec.			
d.	h.	m.	s.	m.	s.	°	'	"	'	"	d.	h.	m.
May 1	5	45	13.71	45	48.92	+26	32	17.1	32	39.7	+9.27734	+9.0896	-3.54
2	5	49	45.71	50	20.85	26	34	56.1	35	14.0	9.27514	8.9899	3.56
3	5	54	16.28	54	51.33	26	36	59.0	37	12.4	9.27276	8.8632	3.60
4	5	58	45.32	59	20.27	26	38	26.2	38	34.9	9.27018	8.6799	3.61
5	6	3	12.71	3	47.53	26	39	17.5	39	21.6	9.26745	+8.3680	3.62
6	6	7	38.37	8	13.05	26	39	33.6	39	33.1	9.26456	-7.0458	3.68
7	6	12	2.20	12	36.73	26	39	14.7	39	9.6	9.26145	8.4039	3.69
8	6	16	24.09	16	58.43	26	38	21.2	38	11.6	9.25813	8.6911	3.71
9	6	20	43.93	21	18.05	26	36	53.7	36	39.6	9.25462	8.8611	3.72
10	6	25	1.63	25	35.52	26	34	52.5	34	34.0	9.25097	8.9818	3.74
11	6	29	17.11	29	50.75	26	32	18.1	31	55.2	9.24709	9.0744	3.76
12	6	33	30.25	34	3.61	26	29	11.1	28	43.9	9.24297	9.1498	3.78
13	6	37	40.94	38	14.00	26	25	31.9	25	0.4	9.23864	9.2136	3.81
14	6	41	49.08	42	21.83	26	21	20.9	20	45.2	9.23411	9.2682	3.82
15	6	45	54.58	46	27.00	26	16	38.8	15	59.0	9.22935	9.3154	3.84
16	6	49	57.33	50	29.39	26	11	26.5	10	42.6	9.22432	9.3571	3.86
17	6	53	57.21	54	28.88	26	5	44.4	4	56.7	9.21904	9.3941	3.87
18	6	57	54.11	58	25.37	25	59	33.4	58	41.8	9.21345	9.4278	3.89
19	7	1	47.90	2	18.75	25	52	54.0	51	58.7	9.20756	9.4583	3.91
20	7	5	38.46	6	8.86	25	45	46.9	44	48.1	9.20138	9.4861	3.93
21	7	9	25.68	9	55.60	25	38	12.9	37	10.7	9.19486	9.5115	3.94
22	7	13	9.43	13	38.83	25	30	12.9	29	7.3	9.18797	9.5347	3.96
23	7	16	49.56	17	18.43	25	21	47.6	20	38.8	9.18077	9.5559	3.97
24	7	20	25.97	20	54.29	25	12	58.0	11	46.2	9.17317	9.5755	3.99
25	7	23	58.52	24	26.27	25	3	45.0	2	30.4	9.16512	9.5935	4.01
26	7	27	27.06	27	54.21	24	54	9.6	52	52.3	9.15662	9.6102	4.01
27	7	30	51.45	31	17.96	24	44	12.7	42	52.8	9.14766	9.6256	4.03
28	7	34	11.55	34	37.40	24	33	54.8	32	32.6	9.13818	9.6397	4.04
29	7	37	27.21	37	52.88	24	23	17.3	21	52.8	9.12820	9.6530	4.06
30	7	40	38.30	41	2.76	24	12	21.0	10	54.6	9.11764	9.6647	4.07
31	7	43	44.66	44	8.39	23	61	7.3	59	39.0	9.10641	9.6757	4.08
June 1	7	46	46.12	47	9.09	23	49	37.0	48	7.1	9.09449	9.6859	4.09
2	7	49	42.54	50	4.73	23	37	51.1	36	19.8	9.08195	9.6952	4.10
3	7	52	33.80	52	55.18	23	25	50.7	24	18.1	9.06870	9.7037	4.12
4	7	55	19.73	55	40.29	23	13	36.7	12	3.1	9.05455	9.7114	4.14
5	7	58	0.16	58	19.87	22	61	10.2	59	35.8	9.03939	9.7183	4.15
6	8	0	34.91	0	53.75	22	48	32.4	46	57.4	9.02320	9.7245	4.16
7	8	3	3.81	3	21.77	22	35	44.4	34	8.9	9.00593	9.7299	4.18
8	8	5	26.71	5	43.77	22	22	47.3	21	11.7	8.98744	9.7346	4.19
9	8	7	43.44	7	59.58	22	9	42.2	8	6.7	8.96758	9.7388	4.20
10	8	9	53.81	10	9.01	21	56	30.1	54	54.8	8.94613	9.7424	4.21
11	8	11	57.64	12	11.89	21	43	12.1	41	37.1	8.92281	9.7453	4.22
12	8	13	54.72	14	8.00	21	29	49.4	28	15.1	8.89744	9.7473	4.24
13	8	15	44.87	15	57.16	21	16	23.5	14	50.1	8.86972	9.7488	4.25
14	8	17	27.89	17	39.19	21	2	55.4	1	23.1	8.83927	9.7497	4.26
15	8	19	3.58	19	13.88	20	49	26.2	47	55.2	8.80559	9.7500	4.26
16	8	20	31.73	20	41.03	20	35	57.1	34	27.5	8.76787	9.7496	4.29
17	8	21	52.13	22	0.42	20	22	29.4	21	1.5	8.72536	9.7485	4.30
18	8	23	4.54	23	11.82	20	9	4.5	7	38.5	8.67682	9.7466	4.30
19	8	24	8.74	24	15.01	19	55	43.7	54	19.8	8.62037	9.7440	4.32
20	8	25	4.50	25	9.76	19	42	28.2	41	6.5	8.55370	9.7409	4.33
21	8	25	51.61	25	55.87	19	29	19.2	28	0.0	8.47298	9.7369	4.34
22	8	26	29.87	26	33.14	19	16	18.1	15	1.6	8.37094	9.7321	4.35
23	8	26	59.06	27	1.37	19	3	26.3	2	12.7	8.23328	9.7264	4.36
24	8	27	18.97	27	20.34	18	50	45.1	49	34.4	8.02463	9.7202	4.37
25	8	27	29.42	27	29.90	18	38	15.6	37	8.0	+7.59979	9.7130	4.38
26	8	27	30.29	27	29.94	18	25	59.1	24	54.8	-7.43493	9.7048	4.38
27	8	27	21.44	27	20.23	18	13	57.0	12	56.0	7.97963	9.6959	4.38
28	8	27	2.72	27	0.73	18	2	10.4	1	12.8	8.21602	9.6861	4.38
29	8	26	34.04	26	31.33	17	50	40.4	49	46.3	8.36914	9.6751	4.38
30	8	25	55.36	25	51.99	17	39	28.2	38	37.7	8.48172	9.6634	4.38
31	8	25	6.73	25	2.77	+17	28	34.7	27	47.8	-8.57129	-9.6505	-4.38



## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.				Apparent Declination.				Log. Factor 1.		Log. Factor 2.		Mean Solar Time of Meridian Transit.	Side- real Date of Transit.
	At Mean Noon.		At Transit.		At Mean Noon.		At Transit.		In R.A.	In Dec.	In R.A.	In Dec.		
July	d.	h. m. s.	m. s.		° ' "	° ' "	° ' "	° ' "					d. h. m.	d.
	1	8 25 6.73	25 2.77		+17 28 34.7	27 47.8			-8.57129	-9.6505	-4.38	+4.69	183 1 44.9	183
	2	8 24 8.16	24 3.73		17 18 0.9	17 17.6			8.64482	9.6368	4.37	4.68	184 1 40.0	184
	3	8 22 59.77	22 54.95		17 7 47.6	7 7.8			8.70692	9.6220	4.36	4.69	185 1 35.0	185
	4	8 21 41.73	21 36.55		16 57 55.6	57 19.4			8.76035	9.6060	4.34	4.71	186 1 29.7	186
	5	8 20 14.23	20 8.78		16 48 25.9	47 53.2			8.80670	9.5887	4.33	4.73	187 1 24.2	187
	6	8 18 37.57	18 31.99		16 39 19.2	38 49.9			8.84702	9.5700	4.30	4.74	188 1 18.6	188
	7	8 16 52.15	16 46.57		16 30 36.1	30 10.1			8.88236	9.5504	4.29	4.75	189 1 13.0	189
	8	8 14 58.37	14 52.85		16 22 16.9	21 54.2			8.91356	9.5294	4.26	4.76	190 1 7.2	190
	9	8 12 56.69	12 51.34		16 14 22.3	14 2.6			8.94091	9.5066	4.21	4.77	191 1 1.2	191
	0	8 10 47.67	10 42.59		16 6 52.6	6 35.9			8.96461	9.4821	4.15	4.78	192 0 55.1	192
	11	8 8 31.96	8 27.23		15 59 48.4	59 34.4			9.98490	9.4559	4.11	4.78	193 0 49.0	193
	12	8 6 10.28	6 5.99		15 53 9.9	52 58.5			9.00208	9.4279	4.02	4.79	194 0 42.7	194
	13	8 3 43.39	3 39.61		15 46 57.3	46 48.3			9.01637	9.3973	3.93	4.79	195 0 36.4	195
	14	8 1 12.09	1 8.89		15 41 11.0	41 4.1			9.02786	9.3642	3.81	4.80	196 0 30.0	196
	15	7 58 37.25	58 34.69		15 35 51.1	35 46.1			9.03649	9.3284	3.58	4.80	197 0 23.5	197
	16	7 55 59.80	55 57.94		15 30 57.6	30 54.3			9.04233	9.2894	-3.25	4.80	198 0 16.9	198
	17	7 53 30.69	53 19.55		15 26 30.5	26 28.7			9.04557	9.2460	+2.59	4.80	199 0 10.3	199
	18	7 50 40.84	50 40.42		15 22 30.0	22 29.4			9.04641	9.1981	3.42	4.80	200 0 3.8	200
	19	7 48 1.15	48 1.46		15 18 56.0	18 56.4			9.04475	9.1442	3.71	4.80	200 23 57.2	201
	20	7 45 22.57	45 23.59		15 15 48.4	15 49.5			9.04032	9.0829	3.87	4.80	201 23 50.7	202
	21	7 42 46.09	42 47.80		15 13 7.0	13 8.6			9.03309	9.0128	3.97	4.79	202 23 44.2	203
	22	7 40 12.67	40 15.01		15 10 51.5	10 53.4			9.02311	8.9294	4.07	4.78	203 23 37.8	204
	23	7 37 43.22	37 46.15		15 9 1.6	9 3.5			9.01023	8.8289	4.14	4.78	204 23 31.3	205
	24	7 35 18.61	35 22.06		15 7 36.8	7 38.5			8.99436	8.6990	4.18	4.76	205 23 25.0	206
	25	7 32 59.64	33 3.33		15 6 36.7	6 38.0			8.97556	8.5211	4.23	4.75	206 23 18.8	207
	26	7 30 47.01	30 51.96		15 6 0.5	6 1.3			8.95374	8.2237	4.26	4.73	207 23 12.6	208
	27	7 28 41.36	28 45.88		15 5 47.6	5 47.7			8.92846	-6.9208	4.29	4.71	208 23 6.6	209
	28	7 26 43.32	26 48.01		15 5 57.1	5 56.2			8.89927	+8.1576	4.33	4.69	209 23 0.8	210
	29	7 24 53.47	24 58.24		15 6 28.0	6 26.1			8.86567	8.4607	4.34	4.68	210 22 54.9	211
	30	7 23 12.30	23 17.05		15 7 19.3	7 16.3			8.82747	8.6319	4.35	4.64	211 22 49.3	212
Aug.	31	7 21 40.18	21 44.81		15 8 30.1	8 25.8			8.78404	8.7480	4.37	4.61	212 22 43.9	213
	1	7 20 17.44	20 21.86		15 9 59.1	9 53.5			8.73379	8.6333	4.38	4.57	213 22 38.6	214
	2	7 19 4.39	19 8.50		15 11 44.9	11 38.0			8.67511	8.5899	4.38	4.53	214 22 33.4	215
	3	7 18 1.27	18 4.98		15 13 46.1	13 37.9			8.60582	8.526	4.38	4.48	215 22 28.4	216
	4	7 17 8.21	17 11.46		15 16 1.5	15 52.0			8.52288	8.9962	4.38	4.44	216 22 23.6	217
	5	7 16 25.24	16 27.92		15 18 29.6	18 18.8			8.42051	9.0309	4.38	4.37	217 22 19.0	218
	6	7 15 52.34	15 54.41		15 21 9.1	20 57.0			8.28647	9.0594	4.38	4.33	218 22 14.4	219
	7	7 15 29.49	15 30.88		15 23 58.5	23 45.2			8.09206	9.0834	4.38	4.22	219 22 10.2	220
	8	7 15 16.65	15 17.30		15 26 56.5	26 42.1			-7.73373	9.1024	4.37	4.12	220 22 6.1	221
	9	7 15 13.73	15 13.60		15 30 1.5	29 46.1			+7.10125	9.1170	4.36	3.99	221 22 2.1	222
	10	7 15 20.57	15 19.62		15 33 11.9	32 55.6			7.91020	9.1274	4.35	3.76	222 21 58.2	223
	11	7 15 36.98	15 35.17		15 36 26.2	36 9.1			8.16818	9.1346	4.35	+3.37	223 21 54.5	224
	12	7 16 2.80	16 0.09		15 39 43.0	39 25.3			8.32665	9.1385	4.33	-2.99	224 21 51.0	225
	13	7 16 37.84	16 34.22		15 43 0.9	42 42.7			8.44032	9.1390	4.32	3.59	225 21 47.6	226
	14	7 17 21.87	17 17.33		15 46 18.4	45 59.8			8.52729	9.1368	4.31	3.80	226 21 44.3	227
	15	7 18 14.59	18 9.13		15 49 34.2	49 15.4			8.59820	9.1319	4.30	3.99	227 21 41.4	228
	16	7 19 15.78	19 9.37		15 52 47.3	52 28.4			8.65728	9.1245	4.28	4.13	228 21 38.3	229
	17	7 20 25.17	20 17.83		15 55 56.3	55 37.5			8.70781	9.1130	4.27	4.22	229 21 35.5	230
	18	7 21 42.52	21 34.23		15 58 59.7	58 41.2			8.75199	9.0984	4.25	4.30	230 21 32.8	231
	19	7 23 7.61	22 58.40		16 1 56.2	1 38.2			8.79083	9.0797	4.24	4.36	231 21 30.3	232
	20	7 24 40.18	24 30.05		16 4 44.5	4 27.1			8.82527	9.0568	4.23	4.39	232 21 27.4	233
	21	7 26 19.97	26 8.93		16 7 23.4	7 6.8			8.85624	9.0297	4.22	4.45	233 21 25.6	234
	22	7 28 6.77	27 54.82		16 9 51.8	9 36.1			8.88424	8.9973	4.20	4.49	234 21 23.4	235
	23	7 30 0.34	29 47.49		16 12 8.5	11 54.0			8.90960	8.9583	4.18	4.53	235 21 21.4	236
	24	7 32 0.43	31 46.70		16 14 12.4	13 59.3			8.93274	8.9117	4.17	4.56	236 21 19.4	237
	25	7 34 6.79	33 52.22		16 16 2.4	15 50.7			8.95391	8.8545	4.15	4.59	237 21 17.6	238
	26	7 36 19.22	36 3.82		16 17 37.4	17 27.3			8.97348	8.7832	4.14	4.61	238 21 15.8	239
	27	7 38 37.51	38 21.29		16 18 56.8	18 48.0			8.99154	8.6923	4.12	4.64	239 21 14.2	240
	28	7 41 1.45	40 44.44		16 19 58.3	19 51.9			9.00828	8.5692	4.11	4.66	240 21 12.7	241
	29	7 43 30.84	43 13.06		16 20 42.1	20 37.9			9.02380	8.3832	4.09	4.68	241 21 11.3	242
	30	7 46 5.47	45 46.94		16 21 7.0	21 5.0			9.03826	+8.0292	4.07	4.69	242 21 9.9	243
	31	7 48 46.15	48 25.89		+16 21 12.1	21 12.5			+9.05166	-7.5318	+4.05	-4.71	243 21 8.7	244



FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.																
Day of Month.		Apparent Right Ascension.				Apparent Declination.				Log. Factor 1.		Log. Factor 2.		Mean Solar Time of Meridian Transit.	Side-real Date of Transit.	
		At Mean Noon.		At Transit.		At Mean Noon.		At Transit.		In R.A.	In Dec.	In R.A.	In Dec.			
d.	h. m. s.	m.	s.	°	'	°	'	°	'					d. h. m.	d.	
Sept. 1	7 51 29.67	51	9.70	+16 20	56.5	20	59.4	+9.06420	-8.2583	+4.03	-4.72	244 21	7.4	245		
2	7 54 18.85	53	58.18	16 20	19.4	20	25.0	9.07595	8.5202	4.02	4.74	245 21	6.2	246		
3	7 57 12.52	56	51.18	16 19	20.2	19	28.6	9.08693	8.6892	4.00	4.75	246 21	5.1	247		
4	8 0 10.49	59	48.52	16 17	58.0	18	9.3	9.09723	8.8138	3.99	4.76	247 21	4.2	248		
5	8 3 12.59	2	50.01	16 16	12.2	16	26.5	9.10684	8.9117	3.96	4.78	248 21	3.2	249		
6	8 6 18.63	5	55.47	16 14	2.3	14	19.6	9.11580	8.9942	3.94	4.78	249 21	2.4	250		
7	8 9 28.43	9	4.72	16 11	27.6	11	48.1	9.12419	9.0649	3.92	4.79	250 21	1.6	251		
8	8 12 41.83	12	17.58	16 8	27.6	8	51.4	9.13214	9.1268	3.90	4.79	251 21	0.9	252		
9	8 15 58.69	15	33.91	16 5	1.9	5	29.0	9.13960	9.1811	3.88	4.80	252 21	0.2	253		
10	8 19 18.85	18	53.58	16 1	10.3	1	40.7	9.14658	9.2299	3.86	4.80	253 20	59.6	254		
11	8 22 42.15	22	16.42	15 56	52.4	57	26.2	9.15310	9.2751	3.84	4.81	254 20	59.0	255		
12	8 26 8.43	25	42.26	15 52	7.6	52	45.0	9.15922	9.3163	3.81	4.81	255 20	58.5	256		
13	8 29 37.55	29	10.96	15 46	55.7	47	36.6	9.16497	9.3542	3.79	4.82	256 20	58.0	257		
14	8 33 9.37	32	42.39	15 41	16.5	42	1.0	9.17036	9.3893	3.76	4.82	257 20	57.6	258		
15	8 36 43.76	36	16.41	15 35	9.8	35	57.9	9.17547	9.4218	3.76	4.82	258 20	57.2	259		
16	8 40 20.61	39	52.90	15 28	35.5	29	27.2	9.18024	9.4526	3.70	4.82	259 20	56.9	260		
17	8 43 59.78	43	31.75	15 21	33.2	22	28.6	9.18471	9.4815	3.69	4.82	260 20	56.7	261		
18	8 47 41.16	47	12.82	15 14	2.8	15	1.9	9.18893	9.5084	3.65	4.83	261 20	56.5	262		
19	8 51 24.64	50	55.99	15 6	4.4	7	7.1	9.19291	9.5342	3.63	4.82	262 20	56.2	263		
20	8 55 10.12	54	41.18	14 57	37.6	58	44.0	9.19667	9.5585	3.60	4.82	263 20	56.0	264		
21	8 58 57.50	58	28.30	14 48	42.5	49	52.6	9.20022	9.5814	3.59	4.82	264 20	55.8	265		
22	9 2 46.69	2	17.25	14 39	19.1	40	32.8	9.20355	9.6033	3.57	4.82	265 20	55.7	266		
23	9 6 37.59	6	7.92	14 29	27.3	30	44.7	9.20664	9.6241	3.56	4.82	266 20	55.6	267		
24	9 10 30.09	10	0.22	14 19	7.1	20	28.1	9.20957	9.6440	3.55	4.82	267 20	55.6	268		
25	9 14 24.13	13	54.06	14 8	18.5	9	43.2	9.21236	9.6631	3.54	4.82	268 20	55.5	269		
26	9 18 19.64	17	49.37	13 57	1.5	58	29.9	9.21501	9.6813	3.51	4.82	269 20	55.5	270		
27	9 22 16.55	21	46.10	13 45	16.2	46	48.2	9.21750	9.6986	3.48	4.82	270 20	55.5	271		
28	9 26 14.78	25	44.17	13 33	2.8	34	38.4	9.21983	9.7153	3.44	4.81	271 20	55.5	272		
29	9 30 14.25	29	43.50	13 20	21.3	22	0.5	9.22200	9.7313	3.42	4.81	272 20	55.3	273		
30	9 34 14.89	33	44.01	13 7	12.0	8	54.7	9.22409	9.7464	3.41	4.81	273 20	55.6	274		
Oct. 1	9 38 16.66	37	45.66	12 53	35.2	55	21.3	9.22608	9.7610	3.37	4.82	274 20	55.7	275		
2	9 42 19.50	41	48.39	12 39	30.9	41	20.4	9.22789	9.7753	3.35	4.81	275 20	55.9	276		
3	9 46 23.32	45	52.10	12 24	59.2	26	52.2	9.22955	9.7887	3.34	4.81	276 20	55.9	277		
4	9 50 28.06	49	56.74	12 10	0.8	11	57.0	9.23120	9.8018	3.31	4.80	277 20	56.0	278		
5	9 54 33.70	54	2.29	11 54	35.5	56	35.1	9.23273	9.8140	3.28	4.80	278 20	56.1	279		
6	9 58 40.18	58	8.69	11 38	44.2	40	47.0	9.23416	9.8260	3.23	4.79	279 20	56.3	280		
7	10 2 47.44	2	15.88	11 22	26.9	24	32.9	9.23548	9.8374	3.20	4.78	280 20	56.5	281		
8	10 6 55.42	6	23.79	11 5	44.1	7	53.2	9.23669	9.8483	3.18	4.78	281 20	56.6	282		
9	10 11 4.07	10	32.39	10 48	36.3	50	48.5	9.23729	9.8588	3.16	4.77	282 20	56.8	283		
10	10 15 13.34	14	41.64	10 31	3.9	33	19.0	9.23887	9.8690	3.13	4.76	283 20	57.1	284		
11	10 19 23.21	18	51.49	10 13	7.1	15	25.0	9.23989	9.8786	3.10	4.75	284 20	57.4	285		
12	10 23 33.65	23	1.89	9 54	46.6	57	7.3	9.24083	9.8879	3.06	4.73	285 20	57.6	286		
13	10 27 44.61	27	12.84	9 36	2.9	38	26.3	9.24169	9.8968	3.03	4.73	286 20	57.9	287		
14	10 31 56.05	31	24.26	9 16	56.5	19	22.5	9.24249	9.9052	3.01	4.72	287 20	58.1	288		
15	10 36 7.94	35	36.13	8 57	27.9	59	56.5	9.24323	9.9135	3.01	4.71	288 20	58.3	289		
16	10 40 20.26	39	48.44	8 37	37.5	40	8.7	9.24399	9.9213	2.96	4.69	289 20	58.6	290		
17	10 44 33.00	44	1.18	8 17	25.8	19	59.4	9.24467	9.9289	2.93	4.68	290 20	58.9	291		
18	10 48 46.13	48	14.31	7 56	53.4	59	29.4	9.24531	9.9360	2.91	4.68	291 20	59.1	292		
19	10 52 59.62	52	27.80	7 36	1.0	38	39.2	9.24591	9.9429	2.91	4.66	292 20	59.4	293		
20	10 57 13.46	56	41.66	7 14	49.0	17	29.4	9.24649	9.9495	2.91	4.64	293 20	59.7	294		
21	11 1 27.64	0	55.85	6 53	18.0	56	0.5	9.24707	9.9558	2.91	4.63	294 21	0.0	295		
22	11 5 42.16	5	10.37	6 31	28.6	34	13.1	9.24769	9.9617	2.86	4.62	295 21	0.3	296		
23	11 9 57.02	9	25.25	6 9	21.3	12	7.7	9.24820	9.9677	2.89	4.60	296 21	0.6	297		
24	11 14 12.19	13	40.43	5 46	56.3	49	44.7	9.24876	9.9731	2.89	4.59	297 21	0.9	298		
25	11 18 27.69	17	55.95	5 24	14.7	27	4.7	9.24930	9.9784	2.91	4.57	298 21	1.2	299		
26	11 22 43.52	22	11.79	5 1	16.8	4	8.5	9.24988	9.9834	2.91	4.56	299 21	1.5	300		
27	11 26 59.69	26	27.98	4 38	3.3	40	56.5	9.25047	9.9882	2.89	4.54	300 21	1.9	301		
28	11 31 16.20	30	44.51	4 14	34.7	17	29.5	9.25103	9.9928	2.89	4.52	301 21	2.2	302		
29	11 35 33.04	35	1.36	3 50	51.6	53	47.9	9.25162	9.9971	2.96	4.50	302 21	2.5	303		
30	11 39 50.21	39	18.55	3 26	54.8	29	52.4	9.25225	0.0011	2.89	4.48	303 21	2.8	304		
31	11 44 7.77	43	36.13	3 2	44.9	5	43.6	9.25279	0.0051	2.93	4.46	304 21	3.2	305		
32	11 48 25.66	47	54.05	+2 38	22.3	41	22.1	+9.25334	-0.0086	+2.99	-4.42	305 21	3.6	306		



## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.			Apparent Declination.			Log. Factor $t$ .		Log. Factor $t^2$ .		Mean Solar Time of Meridian Transit.			Side- real Date of Transit.
	At Mean Noon.	At Transit.		At Mean Noon.	At Transit.		In R.A.	In Dec.	In R.A.	In Dec.	d. h. m.		d.	
Nov. 1	d. 11 48 25.66	m. 47 54.05	+	0 38 22.3	41 22.1	+9.25334	-0.0086	+2.99	-4.42	305 21	8.6		306	
2	11 52 43.91	52 12.32		2 13 47.9	16 48.7	9.25402	0.0119	2.99	4.41	306 21	4.0		307	
3	11 57 2.56	56 30.98		1 49 2.5	52 4.2	9.25470	0.0152	2.99	4.37	307 21	4.3		308	
4	12 1 21.62	0 50.06		1 24 6.5	27 9.2	9.25538	0.0181	2.99	4.34	308 21	4.7		309	
5	12 5 41.08	5 9.52		0 59 0.8	62 4.3	9.25603	0.0208	3.01	4.30	309 21	5.0		310	
6	12 10 0.94	9 29.39		0 33 46.1	36 50.8	9.25673	0.0233	3.03	4.26	310 21	5.3		311	
7	12 14 21.22	13 49.70	+	0 8 23.1	11 27.9	9.25746	0.0255	3.03	4.22	311 21	5.7		312	
8	12 18 41.95	18 10.46	-	0 17 7.5	14 2.3	9.25818	0.0276	3.06	4.16	312 21	6.2		313	
9	12 23 3.12	22 31.64		0 42 44.9	39 39.4	9.25896	0.0294	3.06	4.11	313 21	6.6		314	
10	12 27 24.77	26 53.30		1 8 28.5	5 22.7	9.25976	0.0311	3.08	4.03	314 21	7.0		315	
11	12 31 46.90	31 15.46		1 34 17.5	31 11.5	9.26059	0.0325	3.08	3.99	315 21	7.4		316	
12	12 36 9.54	35 38.12		2 0 11.1	57 5.1	9.26140	0.0336	3.10	3.91	316 21	7.9		317	
13	12 40 32.68	40 1.28		2 26 8.6	23 2.6	9.26226	0.0346	3.11	3.76	317 21	8.3		318	
14	12 44 56.35	44 24.97		2 52 9.3	49 3.4	9.26316	0.0354	3.14	3.59	318 21	8.8		319	
15	12 49 20.57	48 49.20		3 18 12.4	15 6.8	9.26408	0.0360	3.14	3.29	319 21	9.2		320	
16	12 53 45.37	53 14.02		3 44 17.1	41 12.0	9.26502	0.0363	3.19	-2.68	320 21	9.7		321	
17	12 58 10.76	57 39.43		4 10 22.6	7 18.0	9.26602	0.0364	3.18	+3.16	321 21	10.2		322	
18	13 2 36.79	2 5.48		4 36 28.3	33 24.2	9.26706	0.0364	3.20	3.47	322 21	10.7		323	
19	13 7 3.45	6 32.15		5 2 33.4	59 29.9	9.26812	0.0361	3.21	3.71	323 21	11.2		324	
20	13 11 30.77	10 59.49		5 28 37.2	25 34.5	9.26921	0.0356	3.23	3.79	324 21	11.7		325	
21	13 15 58.78	15 27.51		5 54 38.8	51 37.0	9.27036	0.0349	3.25	3.88	325 21	12.2		326	
22	13 20 27.51	19 56.27		6 20 37.7	17 36.8	9.27152	0.0341	3.28	3.99	326 21	12.8		327	
23	13 24 56.98	24 25.75		6 46 33.3	43 33.4	9.27276	0.0332	3.29	4.10	327 21	13.3		328	
24	13 29 27.23	28 56.02		7 12 24.8	9 26.1	9.27403	0.0317	3.30	4.16	328 21	13.9		329	
25	13 33 58.28	33 27.09		7 38 10.9	35 13.4	9.27535	0.0302	3.31	4.19	329 21	14.4		330	
26	13 38 30.16	37 58.97		8 3 51.2	0 54.9	9.27666	0.0284	3.33	4.22	330 21	15.0		331	
27	13 43 2.88	42 31.70		8 29 24.9	26 30.1	9.27806	0.0265	3.34	4.29	331 21	15.6		332	
28	13 47 36.49	47 5.84		8 54 51.4	51 58.2	9.27949	0.0243	3.35	4.32	332 21	16.3		333	
29	13 52 11.01	51 39.88		9 20 9.8	17 18.1	9.28091	0.0219	3.37	4.36	333 21	16.9		334	
30	13 56 46.46	56 15.34		9 45 18.8	42 28.9	9.28245	0.0191	3.36	4.40	334 21	17.5		335	
Dec. 1	14 1 22.89	0 51.77		10 10 18.3	7 30.2	9.28393	0.0162	3.38	4.45	335 21	18.1		336	
2	14 6 0.27	5 29.19		10 35 7.3	32 21.3	9.28551	0.0130	3.39	4.46	336 21	18.9		337	
3	14 10 38.66	10 7.63		10 59 45.0	57 1.1	9.28707	0.0096	3.41	4.50	337 21	19.6		338	
4	14 15 18.08	14 47.08		11 24 10.8	21 28.8	9.28872	0.0059	3.41	4.52	338 21	20.3		339	
5	14 19 58.56	19 27.54		11 48 23.5	45 43.7	9.29036	0.0018	3.41	4.54	339 21	21.0		340	
6	14 24 40.10	24 9.10		12 12 22.3	9 44.9	9.29200	9.9976	3.41	4.57	340 21	21.8		341	
7	14 29 22.71	28 51.77		12 36 6.6	33 31.6	9.29366	9.9930	3.42	4.59	341 21	22.6		342	
8	14 34 6.41	33 35.53		12 59 35.5	57 3.1	9.29531	9.9881	3.43	4.61	342 21	23.5		343	
9	14 38 51.21	38 20.36		13 22 48.1	20 18.3	9.29706	9.9829	3.43	4.63	343 21	24.2		344	
10	14 43 37.15	43 6.32		13 45 43.7	43 16.4	9.29876	9.9774	3.43	4.66	344 21	25.0		345	
11	14 48 24.22	47 53.43		14 8 21.4	5 56.7	9.30049	9.9715	3.43	4.68	345 21	25.8		346	
12	14 53 12.43	52 41.68		14 30 40.3	28 18.5	9.30219	9.9653	3.44	4.68	346 21	26.6		347	
13	14 58 1.78	57 31.08		14 52 39.7	50 20.9	9.30395	9.9588	3.44	4.70	347 21	27.5		348	
14	15 2 52.30	2 21.66		15 14 18.8	12 3.0	9.30567	9.9519	3.44	4.72	348 21	28.4		349	
15	15 7 43.98	7 13.41		15 35 36.8	33 24.1	9.30745	9.9446	3.44	4.73	349 21	29.3		350	
16	15 12 36.85	12 6.35		15 56 32.9	54 23.4	9.30916	9.9368	3.44	4.75	350 21	30.3		351	
17	15 17 30.88	17 0.46		16 17 6.3	14 59.9	9.31092	9.9287	3.44	4.76	351 21	31.2		352	
18	15 22 26.10	21 55.75		16 37 16.2	35 13.1	9.31265	9.9202	3.44	4.78	352 21	32.2		353	
19	15 27 22.50	26 52.23		16 57 1.9	55 2.2	9.31437	9.9111	3.45	4.79	353 21	33.2		354	
20	15 32 20.08	31 49.90		17 16 22.5	14 26.3	9.31613	9.9017	3.44	4.80	354 21	34.2		355	
21	15 37 18.86	36 48.77		17 35 17.5	33 24.6	9.31783	9.8917	3.45	4.81	355 21	35.2		356	
22	15 42 18.82	41 48.83		17 53 46.1	51 56.7	9.31960	9.8812	3.44	4.83	356 21	36.3		357	
23	15 47 19.98	46 50.09		18 11 47.5	10 1.7	9.32127	9.8701	3.44	4.84	357 21	37.4		358	
24	15 52 22.30	51 52.54		18 29 20.9	27 38.7	9.32297	9.8583	3.43	4.85	358 21	38.5		359	
25	15 57 25.79	56 56.15		18 46 25.4	44 46.8	9.32460	9.8460	3.43	4.86	359 21	39.6		360	
26	16 2 30.43	2 0.91		19 3 0.5	1 25.5	9.32628	9.8330	3.43	4.86	360 21	40.7		361	
27	16 7 36.23	7 6.83		19 19 5.5	17 34.2	9.32789	9.8194	3.43	4.88	361 21	41.8		362	
28	16 12 43.16	12 13.90		19 34 39.8	33 12.3	9.32951	9.8049	3.41	4.89	362 21	43.0		363	
29	16 17 51.22	17 22.11		19 49 42.5	48 18.9	9.33104	9.7895	3.42	4.89	363 21	44.2		364	
30	16 23 0.38	22 31.42		20 4 13.0	2 53.2	9.33258	9.7733	3.41	4.90	364 21	45.4		365	
31	16 28 10.62	27 41.85	-	20 18 10.8	16 54.7	+9.33413	-9.7563	+3.41	+4.91	365 21	46.7		366	



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sideral Minutes.		Log. Coefficient of $t^2$ .	
		At Sideral Oh.	At Transit.	At Sideral Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
Jan. 1 19 55.3	1	14 39 24.58	40 53.32	14 31 38.3	38 44.3	+9.00305	-9.6855	+2.66	+4.15
2 19 53.8	2	14 41 49.65	43 18.73	14 43 13.6	50 16.9	9.00354	9.6819	2.66	4.16
3 19 52.3	3	14 44 14.91	45 44.36	14 54 42.8	61 43.5	9.00406	9.6781	2.66	4.17
4 19 50.8	4	14 46 40.36	48 10.15	15 6 5.9	13 4.0	9.00461	9.6741	2.65	4.18
5 19 49.2	5	14 49 5.98	50 36.12	15 17 22.8	24 18.2	9.00516	9.6702	2.65	4.18
6 19 47.7	6	14 51 31.78	53 2.31	15 28 33.5	35 26.2	9.00570	9.6661	2.64	4.18
7 19 46.2	7	14 53 57.77	55 28.65	15 39 37.9	46 27.7	9.00624	9.6620	2.64	4.18
8 19 44.7	8	14 56 23.94	57 55.18	15 50 36.0	57 22.9	9.00677	9.6578	2.63	4.19
9 19 43.3	9	14 58 50.39	60 21.88	16 1 27.6	8 11.5	9.00729	9.6534	2.63	4.20
10 19 41.8	10	15 1 16.81	2 48.76	16 12 12.7	18 53.5	9.00780	9.6490	2.62	4.21
11 19 40.3	11	15 3 43.51	5 15.83	16 22 51.1	29 28.8	9.00832	9.6445	2.62	4.21
12 19 38.8	12	15 6 10.38	7 43.06	16 33 22.8	39 57.4	9.00884	9.6398	2.62	4.21
13 19 37.3	13	15 8 37.43	10 10.46	16 43 47.8	50 19.3	9.00934	9.6351	2.61	4.21
14 19 35.8	14	15 11 4.64	12 38.03	16 54 6.1	60 34.1	9.00983	9.6304	2.61	4.22
15 19 34.4	15	15 13 32.02	15 5.76	17 4 17.4	10 42.1	9.01032	9.6254	2.60	4.23
16 19 32.9	16	15 15 59.56	17 33.67	17 14 21.7	20 43.0	9.01080	9.6203	2.59	4.23
17 19 31.4	17	15 18 27.27	20 1.72	17 24 18.9	30 36.8	9.01125	9.6152	2.58	4.24
18 19 29.9	18	15 20 55.12	22 29.92	17 34 9.1	40 23.3	9.01167	9.6099	2.56	4.24
19 19 28.5	19	15 23 23.11	24 58.25	17 43 52.0	50 2.5	9.01208	9.6045	2.54	4.25
20 19 27.0	20	15 25 51.24	27 26.72	17 53 27.6	59 34.4	9.01247	9.5990	2.51	4.25
21 19 25.5	21	15 28 19.50	29 55.32	18 2 55.9	8 59.0	9.01283	9.5934	2.48	4.25
22 19 24.1	22	15 30 47.88	32 24.03	18 12 16.8	18 16.0	9.01319	9.5877	2.46	4.25
23 19 22.6	23	15 33 16.38	34 52.86	18 21 30.3	27 25.6	9.01355	9.5818	2.45	4.26
24 19 21.2	24	15 35 45.00	37 21.81	18 30 36.3	36 27.6	9.01389	9.5758	2.43	4.27
25 19 19.7	25	15 38 13.73	39 50.88	18 39 34.7	45 21.9	9.01422	9.5697	2.41	4.27
26 19 18.3	26	15 40 42.58	42 20.05	18 48 25.4	54 8.5	9.01452	9.5634	2.40	4.27
27 19 16.8	27	15 43 11.53	44 49.31	18 57 8.5	62 47.5	9.01481	9.5570	2.39	4.28
28 19 15.4	28	15 45 40.57	47 18.67	19 5 43.8	11 18.6	9.01509	9.5505	2.37	4.27
29 19 13.9	29	15 48 9.70	49 48.13	19 14 11.5	19 42.1	9.01537	9.5439	2.35	4.28
30 19 12.5	30	15 50 38.95	52 17.68	19 22 31.4	27 57.7	9.01564	9.5371	2.33	4.28
Feb. 1 19 11.0	31	15 53 8.27	54 47.32	19 30 43.5	36 5.5	9.01588	9.5302	2.30	4.28
1 19 9.6	32	15 55 37.67	57 17.04	19 38 47.8	44 5.4	9.01611	9.5232	2.27	4.29
2 19 8.1	33	15 58 7.15	59 46.83	19 46 44.2	51 57.3	9.01635	9.5160	2.24	4.29
3 19 6.7	34	16 0 36.71	2 16.71	19 54 32.7	59 41.4	9.01659	9.5087	2.21	4.29
4 19 5.3	35	16 3 6.36	4 46.66	20 2 13.3	7 17.4	9.01681	9.5012	2.18	4.29
5 19 3.8	36	16 5 36.08	7 16.68	20 9 45.9	14 45.4	9.01701	9.4935	2.15	4.29
6 19 2.4	37	16 8 5.86	9 46.76	20 17 10.5	22 5.4	9.01718	9.4856	2.11	4.29
7 19 0.9	38	16 10 35.69	12 16.89	20 24 27.0	29 17.1	9.01733	9.4776	2.06	4.29
8 18 59.5	39	16 13 5.58	14 47.05	20 31 35.4	36 20.7	9.01745	9.4693	+2.00	4.30
9 18 58.1	40	16 15 35.50	17 17.25	20 38 35.6	43 16.2	9.01753	9.4609		4.30
10 18 56.6	41	16 18 5.44	19 47.47	20 45 27.7	50 3.4	9.01757	9.4522		4.30
11 18 55.2	42	16 20 35.39	22 17.70	20 52 11.5	56 42.2	9.01762	9.4434		4.30
12 18 53.8	43	16 23 5.36	24 47.95	20 58 47.1	63 12.9	9.01768	9.4344		4.30
13 18 52.3	44	16 25 35.36	27 18.21	21 5 14.5	9 35.3	9.01773	9.4252		4.30
14 18 50.9	45	16 28 5.36	29 48.47	21 11 33.7	15 49.6	9.01776	9.4157		4.30
15 18 49.5	46	16 30 35.37	32 18.76	21 17 44.6	21 55.5	9.01777	9.4061		4.30
16 18 48.0	47	16 33 5.39	34 49.03	21 23 47.3	27 53.2	9.01775	9.3963		4.30
17 18 46.6	48	16 35 35.39	37 19.26	21 29 41.8	33 42.6	9.01767	9.3862	-2.00	4.30
18 18 45.2	49	16 38 5.35	39 49.44	21 35 28.1	39 23.6	9.01752	9.3758	2.15	4.30
19 18 43.7	50	16 40 35.35	42 19.55	21 41 6.0	44 56.3	9.01731	9.3651	2.25	4.30
20 18 42.3	51	16 43 5.06	44 49.54	21 46 35.6	50 20.6	9.01702	9.3540	2.33	4.30
21 18 40.9	52	16 45 34.77	47 19.45	21 51 56.8	55 36.4	9.01666	9.3427	2.34	4.31
22 18 39.4	53	16 48 4.39	49 49.26	21 57 9.6	60 43.9	9.01641	9.3311	2.37	4.30
23 18 38.0	54	16 50 33.91	52 18.96	22 2 14.0	5 43.1	9.01616	9.3192	2.42	4.30
24 18 36.5	55	16 53 3.31	54 48.55	22 7 10.2	10 34.1	9.01584	9.3071	2.47	4.29
25 18 35.1	56	16 55 32.59	57 17.99	22 11 58.2	15 16.8	9.01547	9.2948	2.50	4.29
26 18 33.7	57	16 58 1.75	59 47.30	22 16 38.0	19 51.4	9.01507	9.2822	2.53	4.29
27 18 32.2	58	17 0 30.76	2 16.46	22 21 9.8	24 17.9	9.01464	9.2694	2.55	4.29
28 18 30.7	59	17 2 59.62	4 45.46	22 25 33.5	28 36.3	9.01418	9.2561	2.56	4.29
29 18 29.3	60	17 5 28.31	7 14.30	22 29 49.1	32 46.5	9.01370	9.2423	2.60	4.29
30 18 27.8	61	17 7 56.85	9 42.96	22 33 56.6	36 48.4	9.01322	9.2279	2.64	4.29
31 18 26.3	62	17 10 25.22	12 11.45	22 37 55.9	40 42.2	+9.01271	-9.2130	-2.67	+4.29



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
Mar. 1 18 27.8	61	h. m. s. 17 7 56.85	m. s. 9 42.96	° ' " -22 33 56.6	' " 36 48.4	+9.01322	-9.2279	-2.64	+4.29
2 18 26.3	62	17 10 25.22	12 11.45	22 37 55.9	40 42.2	9.01271	9.2130	2.66	4.29
3 18 24.9	63	17 12 53.40	14 39.75	22 41 46.9	44 28.0	9.01215	9.1978	2.67	4.28
4 18 23.4	64	17 15 21.39	17 7.85	22 45 30.0	48 5.7	9.01156	9.1823	2.69	4.28
5 18 21.9	65	17 17 49.17	19 35.74	22 49 5.1	51 35.3	9.01097	9.1661	2.70	4.29
6 18 20.4	66	17 20 16.75	22 3.42	22 52 32.1	54 57.1	9.01036	9.1494	2.71	4.28
7 18 19.0	67	17 22 44.12	24 30.87	22 55 51.3	58 10.9	9.00970	9.1322	2.74	4.28
8 18 17.5	68	17 25 11.26	26 58.09	22 59 2.6	61 16.9	9.00902	9.1144	2.77	4.28
9 18 16.0	69	17 27 38.16	29 25.05	23 2 6.1	4 15.1	9.00838	9.0960	2.79	4.27
10 18 14.5	70	17 30 4.80	31 51.75	23 5 1.9	7 5.5	9.00749	9.0770	2.81	4.27
11 18 13.0	71	17 32 31.17	34 18.15	23 7 50.0	9 48.2	9.00666	9.0571	2.84	4.27
12 18 11.5	72	17 34 57.25	36 44.26	23 10 30.4	12 23.2	9.00578	9.0364	2.86	4.26
13 18 10.0	73	17 37 23.03	39 10.03	23 13 3.2	14 50.8	9.00488	9.0149	2.89	4.26
14 18 8.5	74	17 39 48.47	41 35.48	23 15 28.5	17 10.8	9.00393	8.9926	2.90	4.26
15 18 7.0	75	17 42 13.58	44 0.57	23 17 46.3	19 23.4	9.00281	8.9692	2.93	4.25
16 18 5.4	76	17 44 38.33	46 25.29	23 19 56.8	21 28.6	9.00173	8.9448	2.95	4.25
17 18 3.9	77	17 47 2.71	48 49.62	23 21 59.9	23 26.6	9.00058	8.9192	2.98	4.24
18 18 2.4	78	17 49 26.69	51 13.54	23 23 55.9	25 17.5	8.99934	8.8924	3.00	4.25
19 18 0.8	79	17 51 50.27	53 37.04	23 25 44.7	27 1.2	8.99805	8.8642	3.02	4.23
20 17 59.3	80	17 54 13.41	56 0.08	23 27 26.5	28 38.0	8.99672	8.8344	3.03	4.22
21 17 57.7	81	17 56 36.10	58 22.66	23 29 1.4	30 8.0	8.99534	8.8029	3.04	4.22
22 17 56.1	82	17 58 58.33	60 44.76	23 30 29.5	31 31.2	8.99390	8.7695	3.05	4.22
23 17 54.5	83	18 1 20.08	3 6.38	23 31 50.8	32 47.8	8.99241	8.7343	3.07	4.21
24 17 53.0	84	18 3 41.33	5 27.48	23 33 5.7	33 57.9	8.99086	8.6969	3.08	4.20
25 17 51.4	85	18 6 2.08	7 48.05	23 34 14.1	35 1.6	8.98927	8.6559	3.10	4.19
26 17 49.8	86	18 8 22.30	10 8.10	23 35 16.1	35 59.0	8.98768	8.6118	3.11	4.18
27 17 48.2	87	18 10 41.99	12 27.60	23 36 11.9	36 50.1	8.98594	8.5634	3.12	4.17
28 17 46.5	88	18 13 1.13	14 46.53	23 37 1.5	37 35.2	8.98420	8.5100	3.13	4.16
29 17 44.9	89	18 15 19.70	17 4.89	23 37 45.1	38 14.3	8.98242	8.4507	3.13	4.15
30 17 43.3	90	18 17 37.70	19 22.66	23 38 22.8	38 47.7	8.98059	8.3832	3.14	4.14
31 17 41.6	91	18 19 55.11	21 39.83	23 38 54.7	39 15.3	8.97870	8.3055	3.15	4.13
Apr. 1 17 40.0	92	18 22 11.92	23 56.37	23 39 21.0	39 37.4	8.97676	8.2136	3.17	4.12
2 17 38.3	93	18 24 28.10	26 12.30	23 39 41.8	39 54.2	8.97478	8.1005	3.18	4.11
3 17 36.6	94	18 26 43.66	28 27.58	23 39 57.3	40 5.7	8.97276	7.9522	3.19	4.10
4 17 34.9	95	18 28 58.59	30 42.20	23 40 7.6	40 12.0	8.97064	7.7309	3.20	4.09
5 17 33.2	96	18 31 12.84	32 56.14	23 40 12.8	40 13.4	8.96845	-7.2800	3.21	4.08
6 17 31.5	97	18 33 26.41	35 9.39	23 40 13.1	40 10.0	8.96623	+7.1638	3.22	4.06
7 17 29.7	98	18 35 39.30	37 21.93	23 40 8.6	40 1.9	8.96395	7.6741	3.23	4.05
8 17 28.0	99	18 37 51.47	39 33.73	23 39 59.5	39 49.4	8.96156	7.8947	3.25	4.03
9 17 26.2	100	18 40 2.89	41 44.77	23 39 46.0	39 32.4	8.95908	8.0361	3.27	4.02
10 17 24.5	101	18 42 13.57	43 55.02	23 39 28.2	39 11.3	8.95652	8.1405	3.28	4.00
11 17 22.7	102	18 44 23.45	46 4.46	23 39 6.2	38 46.3	8.95381	8.2200	3.29	3.97
12 17 20.9	103	18 46 32.51	48 13.06	23 38 40.4	38 17.5	8.95103	8.2833	3.30	3.96
13 17 19.1	104	18 48 40.74	50 20.79	23 38 10.9	37 45.2	8.94809	8.3365	3.32	3.94
14 17 17.3	105	18 50 48.09	52 27.63	23 37 37.9	37 9.6	8.94512	8.3807	3.34	3.90
15 17 15.4	106	18 52 54.55	54 33.55	23 37 1.7	36 31.0	8.94201	8.4180	3.35	3.86
16 17 13.6	107	18 55 0.09	56 38.51	23 36 22.5	35 49.3	8.93876	8.4512	3.37	3.83
17 17 11.7	108	18 57 4.67	58 42.51	23 35 40.3	35 5.1	8.93539	8.4796	3.38	3.78
18 17 9.8	109	18 59 8.28	60 45.50	23 34 55.6	34 18.3	8.93192	8.5039	3.40	3.75
19 17 7.9	110	19 1 10.88	2 47.46	23 34 8.4	33 29.3	8.92832	8.5256	3.41	3.71
20 17 6.0	111	19 3 12.46	4 48.37	23 33 19.0	32 38.2	8.92460	8.5446	3.42	3.68
21 17 4.0	112	19 5 12.98	6 48.20	23 32 27.6	31 45.3	8.92075	8.5601	3.42	3.62
22 17 2.1	113	19 7 12.42	8 46.92	23 31 34.4	30 50.8	8.91679	8.5736	3.43	3.55
23 17 0.1	114	19 9 10.76	10 44.54	23 30 39.7	29 55.0	8.91273	8.5848	3.43	3.47
24 16 58.1	115	19 11 7.99	12 41.03	23 29 43.7	28 58.1	8.90860	8.5939	3.44	3.38
25 16 56.1	116	19 13 4.10	14 36.37	23 28 46.6	28 0.3	8.90435	8.6009	3.44	3.29
26 16 54.1	117	19 14 59.06	16 30.56	23 27 48.8	27 1.9	8.90000	8.6061	3.44	+3.16
27 16 52.0	118	19 16 52.86	18 23.55	23 26 50.4	26 3.2	8.89549	8.6092	3.45	
28 16 49.9	119	19 18 45.46	20 15.31	23 25 51.7	25 4.3	8.89082	8.6107	3.46	
29 16 47.8	120	19 20 36.84	22 5.83	23 24 52.9	24 5.5	8.88600	8.6106	3.47	
30 16 45.7	121	19 22 26.97	23 55.05	23 23 54.2	23 6.9	8.88098	8.6093	3.49	
31 16 43.6	122	19 24 15.80	25 42.97	-23 22 55.8	22 8.8	+8.87579	+8.6062	-3.49	-3.08



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
			At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
May	d. h. m.	Sidereal Date.	h. m. s.	m. s.	° ' "	° ' "				
	1 16 43.6	122	19 24 15.80	25 42.97	-23 22 55.8	22 8.8	+8.87579	+8.6062	-3.49	-3.08
	2 16 41.4	123	19 26 3.33	27 29.54	23 21 57.9	21 11.6	8.87042	8.6007	3.51	3.29
	3 16 39.2	124	19 27 49.52	29 14.75	23 21 1.0	20 15.5	8.86491	8.5929	3.52	3.43
	4 16 37.0	125	19 29 34.34	30 58.57	23 20 5.1	19 20.8	8.85920	8.5829	3.53	3.53
	5 16 34.8	126	19 31 17.78	32 40.95	23 19 10.7	18 27.7	8.85329	8.5704	3.54	3.61
	6 16 32.6	127	19 32 59.78	34 21.89	23 18 18.0	17 36.5	8.84716	8.5547	3.55	3.68
	7 16 30.3	128	19 34 40.33	36 1.35	23 17 27.2	16 47.6	8.84086	8.5367	3.56	3.74
	8 16 28.0	129	19 36 19.40	37 39.28	23 16 38.9	16 1.1	8.83419	8.5151	3.57	3.79
	9 16 25.6	130	19 37 56.93	39 15.64	23 15 52.9	15 17.6	8.82727	8.4895	3.58	3.84
	10 16 23.3	131	19 39 32.89	40 50.38	23 15 10.0	14 37.2	8.82005	8.4576	3.59	3.89
	11 16 20.9	132	19 41 7.23	42 23.46	23 14 30.3	14 0.3	8.81250	8.4214	3.61	3.93
	12 16 18.5	133	19 42 39.91	43 54.84	23 13 54.0	13 27.1	8.80461	8.3776	3.62	3.97
	13 16 16.0	134	19 44 10.89	45 24.47	23 13 21.6	12 58.1	8.79636	8.3231	3.63	4.00
	14 16 13.5	135	19 45 40.11	46 52.30	23 12 53.4	12 33.6	8.78772	8.2549	3.64	4.04
	15 16 11.0	136	19 47 7.53	48 18.29	23 12 29.8	12 13.9	8.77867	8.1680	3.65	4.07
	16 16 8.5	137	19 48 33.12	49 42.40	23 12 11.0	11 59.3	8.76921	8.0511	3.66	4.10
	17 16 5.9	138	19 49 56.81	51 4.58	23 11 57.4	11 50.2	8.75930	7.8791	3.67	4.12
	18 16 3.3	139	19 51 18.58	52 24.79	23 11 49.2	11 46.8	8.74896	+7.3115	3.68	4.15
	19 16 0.7	140	19 52 38.37	53 43.00	23 11 46.9	11 49.5	8.73811	-6.7167	3.69	4.17
	20 15 58.1	141	19 53 56.16	54 59.14	23 11 50.7	11 58.6	8.72672	7.6867	3.70	4.19
	21 15 55.4	142	19 55 11.88	56 13.19	23 12 0.9	12 14.4	8.71479	7.9752	3.71	4.21
	22 15 52.6	143	19 56 25.50	57 25.10	23 12 17.9	12 37.2	8.70232	8.1534	3.71	4.22
	23 15 49.8	144	19 57 36.99	58 34.85	23 12 41.9	13 7.3	8.68924	8.2833	3.72	4.24
	24 15 47.0	145	19 58 46.31	59 42.38	23 13 13.2	13 44.8	8.67553	8.3856	3.73	4.25
	25 15 44.2	146	19 59 53.42	60 47.68	23 13 51.9	14 29.9	8.66115	8.4705	3.73	4.27
	26 15 41.3	147	20 0 58.30	1 50.70	23 14 38.3	15 22.8	8.64605	8.5431	3.74	4.28
	27 15 38.4	148	20 2 0.90	2 51.42	23 15 32.5	16 24.0	8.63013	8.6077	3.75	4.30
	28 15 35.4	149	20 3 1.19	3 49.78	23 16 35.0	17 33.7	8.61326	8.6661	3.76	4.31
	29 15 32.4	150	20 3 59.11	4 45.74	23 17 46.0	18 52.0	8.59541	8.7188	3.77	4.32
	30 15 29.3	151	20 4 54.64	5 39.25	23 19 5.7	20 19.3	8.57644	8.7672	3.78	4.34
	31 15 26.3	152	20 5 47.71	6 30.26	23 20 34.5	21 56.0	8.55614	8.8122	3.78	4.35
June	1 15 23.2	153	20 6 38.28	7 18.72	23 22 12.6	23 42.1	8.53440	8.8536	3.79	4.35
	2 15 20.0	154	20 7 26.29	8 4.60	23 24 0.1	25 37.7	8.51119	8.8920	3.80	4.36
	3 15 16.8	155	20 8 11.78	9 47.85	23 25 57.2	27 43.0	8.48628	8.9278	3.81	4.37
	4 15 13.5	156	20 8 54.53	9 28.41	23 28 4.0	29 57.9	8.45922	8.9611	3.81	4.37
	5 15 10.2	157	20 9 34.64	10 6.26	23 30 20.5	32 22.8	8.42991	8.9924	3.82	4.38
	6 15 6.9	158	20 10 12.03	10 41.31	23 32 47.0	34 58.0	8.39788	9.0225	3.83	4.39
	7 15 3.5	159	20 10 46.63	11 13.53	23 35 23.8	37 43.7	8.36245	9.0514	3.83	4.40
	8 15 0.1	160	20 11 18.38	11 42.85	23 38 11.2	40 40.1	8.32301	9.0789	3.84	4.41
	9 14 56.6	161	20 11 47.22	12 9.22	23 41 9.2	43 47.5	8.27884	9.1055	3.85	4.42
	10 14 53.0	162	20 12 13.11	12 32.60	23 44 18.2	47 6.1	8.22894	9.1309	3.86	4.43
	11 14 49.4	163	20 12 36.01	12 52.93	23 47 38.5	50 35.8	8.17134	9.1551	3.86	4.42
	12 14 45.8	164	20 12 55.84	13 10.16	23 51 9.9	54 16.7	8.10385	9.1780	3.87	4.42
	13 14 42.1	165	20 13 12.59	13 24.28	23 54 52.4	58 8.7	8.02305	9.1997	3.87	4.42
	14 14 38.3	166	20 13 26.21	13 35.25	23 58 46.1	62 11.7	7.92245	9.2203	3.88	4.42
	15 14 34.5	167	20 13 36.68	13 43.03	24 2 50.7	6 25.5	7.78981	9.2397	3.88	4.42
	16 14 30.7	168	20 13 43.96	13 47.60	24 7 6.2	10 50.0	7.59522	9.2580	3.89	4.41
	17 14 26.8	169	20 13 48.03	13 48.96	24 11 32.4	15 24.9	+7.23257	9.2751	3.89	4.40
	18 14 22.8	170	20 13 48.88	13 47.07	24 16 8.9	20 9.9	-6.72813	9.2912	3.90	4.39
	19 14 18.8	171	20 13 46.48	13 41.93	24 20 55.5	25 4.9	7.44587	9.3064	3.89	4.38
	20 14 14.7	172	20 13 40.84	13 33.56	24 25 52.1	30 9.5	7.70258	9.3207	3.89	4.35
	21 14 10.6	173	20 13 31.96	13 21.95	24 30 58.2	35 23.3	7.86262	9.3340	3.89	4.33
	22 14 6.5	174	20 13 19.85	13 7.13	24 36 13.5	40 46.0	7.97899	9.3464	3.88	4.31
	23 14 2.2	175	20 13 4.52	12 49.12	24 41 37.6	46 17.0	8.07017	9.3578	3.88	4.28
	24 13 58.0	176	20 12 46.00	12 27.95	24 47 9.9	51 55.8	8.14473	9.3682	3.88	4.26
	25 13 53.6	177	20 12 24.32	12 3.65	24 52 49.9	57 41.8	8.20788	9.3778	3.87	4.23
	26 13 49.2	178	20 11 59.52	11 36.26	24 58 37.2	63 34.6	8.26234	9.3865	3.87	4.19
	27 13 44.8	179	20 11 31.63	11 5.81	25 4 31.1	9 33.3	8.31028	9.3941	3.86	4.14
	28 13 40.3	180	20 11 0.68	10 32.35	25 10 30.8	15 37.4	8.35285	9.4008	3.85	4.10
	29 13 35.7	181	20 10 26.73	9 55.93	25 16 35.9	21 46.4	8.39095	9.4068	3.85	4.05
	30 13 31.1	182	20 9 49.83	9 16.62	25 22 45.7	27 59.4	8.42529	9.4119	3.84	3.98
	31 13 26.5	183	20 9 10.05	8 34.49	-25 28 59.5	34 15.9	-8.45648	-9.4162	-3.83	-3.90



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
July	d. h. m.	h. m. s.	m. s.	° ' "	° ' "				
1 13 26.5	183	20 9 10.05	8 34.49	-25 28 59.5	34 15.9	-8.45648	-9.4162	-3.83	-3.90
2 13 21.8	184	20 8 27.44	7 49.59	25 35 16.7	40 35.0	8.48494	9.4196	3.81	3.78
3 13 17.1	185	20 7 42.08	7 2.02	25 41 36.3	46 55.9	8.51086	9.4220	3.80	3.63
4 13 12.3	186	20 6 54.06	6 11.83	25 47 57.7	53 17.8	8.53471	9.4235	3.79	-3.31
5 13 7.5	187	20 6 3.43	5 19.14	25 54 19.9	59 39.8	8.55664	9.4240	3.78	
6 13 2.7	188	20 5 10.31	4 24.03	26 0 42.1	6 1.3	8.57668	9.4235	3.76	+3.23
7 12 57.8	189	20 4 14.78	3 26.62	26 7 3.6	12 21.3	8.59499	9.4222	3.74	3.58
8 12 52.9	190	20 3 16.97	2 27.04	26 13 23.6	18 38.9	8.61168	9.4199	3.72	3.78
9 12 47.9	191	20 2 17.00	1 25.41	26 19 41.0	24 53.4	8.62683	9.4166	3.69	3.91
10 12 42.9	192	20 1 15.01	0 21.90	26 25 55.1	31 3.9	8.64046	9.4122	3.66	4.01
11 12 37.9	193	19 60 11.15	59 16.67	26 32 5.0	37 9.3	8.65258	9.4066	3.62	4.10
12 12 32.9	194	19 59 5.60	58 9.88	26 38 9.7	43 8.6	8.66328	9.3999	3.57	4.18
13 12 27.8	195	19 57 58.51	57 1.70	26 44 8.2	49 0.8	8.67262	9.3918	3.51	4.24
14 12 22.7	196	19 56 50.07	55 52.33	26 49 59.5	54 45.0	8.68065	9.3822	3.45	4.30
15 12 17.6	197	19 55 40.46	54 41.95	26 55 42.5	60 20.3	8.68734	9.3711	3.37	4.34
16 12 12.5	198	19 54 29.87	53 30.77	27 1 16.4	5 45.7	8.69271	9.3588	3.26	4.38
17 12 7.4	199	19 53 18.52	52 19.00	27 6 40.4	11 0.6	8.69675	9.3449	3.11	4.41
18 12 2.2	200	19 52 6.62	51 6.83	27 11 53.6	16 3.8	8.69948	9.3293	2.93	4.44
19 11 57.1	201	19 50 54.35	49 54.52	27 16 55.1	20 55.1	8.70084	9.3120	-2.42	4.47
20 11 52.0	202	19 49 41.98	48 42.28	27 21 44.3	25 33.5	8.70090	9.2930	+2.46	4.50
21 11 46.8	203	19 48 29.71	47 30.32	27 26 20.6	29 58.4	8.69963	9.2722	2.89	4.52
22 11 41.7	204	19 47 17.76	46 18.84	27 30 43.3	34 9.3	8.69710	9.2493	3.10	4.53
23 11 36.6	205	19 46 6.33	45 8.04	27 34 51.9	38 5.6	8.69330	9.2240	3.24	4.55
24 11 31.5	206	19 44 55.62	43 58.15	27 38 45.7	41 46.7	8.68829	9.1962	3.35	4.56
25 11 26.4	207	19 43 45.83	42 49.34	27 42 24.4	45 12.6	8.68191	9.1659	3.44	4.57
26 11 21.4	208	19 42 37.18	41 41.82	27 45 47.7	48 22.8	8.67405	9.1327	3.52	4.58
27 11 16.3	209	19 41 29.86	40 35.78	27 48 55.3	51 17.3	8.66468	9.0961	3.58	4.58
28 11 11.3	210	19 40 24.05	39 31.40	27 51 47.0	53 55.6	8.65422	9.0556	3.62	4.59
29 11 6.4	211	19 39 19.96	38 28.92	27 54 22.6	56 17.9	8.64191	9.0106	3.66	4.59
30 11 1.4	212	19 38 17.78	37 28.47	27 56 42.1	58 24.2	8.62804	8.9604	3.70	4.59
31 10 56.5	213	19 37 17.66	36 30.18	27 58 45.5	0 14.4	8.61269	8.9033	3.73	4.59
Aug. 1 10 51.7	214	19 36 19.74	35 34.18	28 0 32.8	1 48.5	8.59568	8.8380	3.76	4.59
2 10 46.9	215	19 35 24.14	34 40.61	28 2 4.0	3 6.6	8.57693	8.7618	3.78	4.58
3 10 42.1	216	19 34 31.01	33 49.61	28 3 19.2	4 9.0	8.55626	8.6700	3.80	4.58
4 10 37.3	217	19 33 40.47	33 1.27	28 4 18.7	4 55.6	8.53354	8.5547	3.82	4.58
5 10 32.7	218	19 32 52.63	32 15.73	28 5 2.5	5 26.9	8.50848	8.3985	3.83	4.57
6 10 28.0	219	19 32 7.60	31 33.09	28 5 30.8	5 42.7	8.48083	8.1566	3.85	4.57
7 10 23.4	220	19 31 25.49	30 53.46	28 5 43.8	5 43.4	8.45011	-7.5820	3.87	4.56
8 10 18.9	221	19 30 46.41	30 16.94	28 5 41.8	5 29.3	8.41578	+7.8124	3.88	4.55
9 10 14.4	222	19 30 10.47	29 43.63	28 5 25.1	5 0.7	8.37725	8.2218	3.89	4.55
10 10 10.0	223	19 29 37.76	29 13.62	28 4 53.8	4 17.6	8.33377	8.4271	3.90	4.54
11 10 5.6	224	19 29 8.36	28 46.98	28 4 8.1	3 20.4	8.28428	8.5643	3.91	4.53
12 10 1.3	225	19 28 42.34	28 23.75	28 3 8.2	2 9.3	8.22734	8.6671	3.92	4.52
13 9 57.0	226	19 28 19.75	28 4.00	28 1 54.3	0 44.3	8.16054	8.7485	3.93	4.52
14 9 52.8	227	19 28 0.66	27 47.78	27 60 26.8	59 6.1	8.08006	8.8152	3.93	4.51
15 9 48.7	228	19 27 45.12	27 35.17	27 58 46.1	57 14.9	7.97963	8.8716	3.94	4.50
16 9 44.6	229	19 27 33.18	27 26.19	27 56 52.5	55 11.1	7.84682	8.9204	3.94	4.49
17 9 40.6	230	19 27 24.88	27 20.86	27 54 46.3	52 54.9	7.65254	8.9635	3.95	4.48
18 9 36.6	231	19 27 20.24	27 19.20	27 52 27.7	50 26.5	-7.28880	9.0020	3.95	4.47
19 9 32.7	232	19 27 19.28	27 21.22	27 49 57.0	47 46.3	+6.78365	9.0366	3.95	4.46
20 9 28.9	233	19 27 21.99	27 26.91	27 47 14.4	44 54.0	7.49965	9.0679	3.95	4.45
21 9 25.1	234	19 27 28.38	27 36.28	27 44 20.2	41 50.6	7.75678	9.0964	3.95	4.43
22 9 21.4	235	19 27 38.44	27 49.29	27 41 14.8	38 36.5	7.91664	9.1223	3.94	4.42
23 9 17.7	236	19 27 52.15	28 5.90	27 37 58.5	35 11.5	8.03197	9.1461	3.94	4.41
24 9 14.1	237	19 28 9.44	28 26.08	27 34 31.6	31 36.1	8.12199	9.1682	3.94	4.40
25 9 10.6	238	19 28 30.29	28 49.78	27 30 54.3	27 50.5	8.19584	9.1887	3.93	4.39
26 9 7.1	239	19 28 54.65	29 16.97	27 27 6.9	23 54.8	8.25828	9.2079	3.93	4.38
27 9 3.7	240	19 29 22.49	29 47.58	27 23 9.5	19 49.5	8.31205	9.2258	3.92	4.37
28 9 0.3	241	19 29 53.73	30 21.56	27 19 2.4	15 34.4	8.35910	9.2429	3.91	4.36
29 8 57.0	242	19 30 28.33	30 58.92	27 14 45.6	11 9.8	8.40113	9.2591	3.91	4.34
30 8 53.8	243	19 31 6.26	31 39.54	27 10 19.5	6 36.4	8.43895	9.2740	3.90	4.33
31 8 50.6	244	19 31 47.46	32 23.40	-27 5 44.5	1 54.3	+8.47318	+9.2878	+3.89	+4.32



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> <sup>2</sup> .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d.	h.	m.		h. m. s.	m. s.	° ' "	° ' "				
Sept.	1	8 47.4	245	19 32 31.88	33 10.45	-26 61 6.8	57 3.4	+8.50449	+9.3011	+3.88	+4.32
	2	8 44.3	246	19 33 19.48	34 0.57	26 56 8.4	52 3.6	8.53299	9.3141	3.87	4.32
	3	8 41.3	247	19 34 10.14	34 53.71	26 51 7.2	46 55.1	8.55902	9.3267	3.87	4.32
	4	8 38.3	248	19 35 3.81	35 49.83	26 45 57.3	41 38.0	8.58319	9.3388	3.86	4.31
	5	8 35.3	249	19 36 0.44	36 48.88	26 40 38.9	36 12.1	8.60570	9.3506	3.85	4.32
	6	8 32.4	250	19 36 59.98	37 50.81	26 35 11.7	30 37.6	8.62676	9.3621	3.84	4.31
	7	8 29.5	251	19 38 2.38	38 55.56	26 29 35.9	24 54.9	8.64649	9.3730	3.83	4.30
	8	8 26.7	252	19 39 7.59	40 3.08	26 23 51.8	19 3.9	8.66498	9.3834	3.83	4.30
	9	8 24.0	253	19 40 15.54	41 13.31	26 17 59.6	13 4.6	8.68240	9.3935	3.82	4.30
	10	8 21.2	254	19 41 26.20	42 26.19	26 11 59.2	6 56.9	8.69882	9.4035	3.81	4.31
	11	8 18.6	255	19 42 39.49	43 41.67	26 5 50.3	0 40.7	8.71430	9.4135	3.80	4.31
	12	8 15.9	256	19 43 55.37	44 59.71	25 59 32.9	54 15.8	8.72898	9.4234	3.79	4.32
	13	8 13.3	257	19 45 13.79	46 20.24	25 53 6.8	47 42.4	8.74284	9.4330	3.78	4.31
	14	8 10.8	258	19 46 34.67	47 43.20	25 46 32.3	41 0.5	8.75593	9.4423	3.77	4.31
	15	8 8.3	259	19 47 57.97	49 8.55	25 39 49.3	34 10.1	8.76842	9.4515	3.76	4.31
	16	8 5.8	260	19 49 23.64	50 36.21	25 32 57.7	27 11.1	8.78028	9.4608	3.75	4.31
	17	8 3.4	261	19 50 51.62	52 6.15	25 25 57.6	20 3.4	8.79153	9.4695	3.74	4.32
	18	8 1.0	262	19 52 21.85	53 38.30	25 18 48.9	12 47.1	8.80223	9.4781	3.72	4.32
	19	7 58.6	263	19 53 54.27	55 12.63	25 11 31.6	5 22.4	8.81246	9.4865	3.71	4.31
	20	7 56.3	264	19 55 28.85	56 49.04	24 64 6.0	57 49.2	8.82217	9.4947	3.70	4.31
	21	7 54.0	265	19 57 5.50	58 27.47	24 56 31.9	50 7.5	8.83129	9.5028	3.68	4.31
	22	7 51.7	266	19 58 44.14	60 7.85	24 48 49.3	42 17.3	8.83996	9.5108	3.67	4.31
	23	7 49.5	267	20 0 24.73	1 50.13	24 40 58.2	34 18.6	8.84821	9.5186	3.65	4.31
	24	7 47.3	268	20 2 7.19	3 34.22	24 32 58.6	26 11.3	8.85599	9.5263	3.64	4.31
	25	7 45.1	269	20 3 51.45	5 20.08	24 24 50.5	17 55.4	8.86341	9.5339	3.62	4.31
	26	7 43.0	270	20 5 37.47	7 7.66	24 16 33.8	9 31.0	8.87050	9.5414	3.61	4.31
	27	7 40.9	271	20 7 25.19	8 56.87	24 8 8.7	0 58.0	8.87719	9.5487	3.59	4.32
	28	7 38.8	272	20 9 14.53	10 47.68	23 59 35.0	52 16.3	8.88353	9.5560	3.58	4.32
	29	7 36.7	273	20 11 5.44	12 40.00	23 50 52.7	43 26.1	8.88956	9.5631	3.56	4.32
	30	7 34.7	274	20 12 57.86	14 38.79	23 42 1.8	34 27.3	8.89528	9.5701	3.55	4.31
Oct.	1	7 32.6	275	20 14 51.73	16 29.02	23 33 2.4	25 19.9	8.90075	9.5770	3.53	4.31
	2	7 30.6	276	20 16 47.02	18 25.63	23 23 54.5	16 4.3	8.90599	9.5837	3.52	4.31
	3	7 28.7	277	20 18 43.67	20 23.57	23 14 38.2	6 40.2	8.91097	9.5902	3.50	4.30
	4	7 26.7	278	20 20 41.64	22 22.78	22 65 13.6	57 7.7	8.91572	9.5966	3.49	4.31
	5	7 24.8	279	20 22 40.87	24 23.23	22 55 40.6	47 26.7	8.92026	9.6030	3.47	4.31
	6	7 22.9	280	20 24 41.33	26 24.88	22 45 59.1	37 37.0	8.92461	9.6094	3.46	4.31
	7	7 21.0	281	20 26 42.97	28 27.68	22 36 9.0	27 38.8	8.92876	9.6157	3.44	4.31
	8	7 19.1	282	20 28 45.76	30 31.63	22 26 10.5	17 32.1	8.93272	9.6219	3.43	4.32
	9	7 17.3	283	20 30 49.66	32 36.67	22 16 8.4	7 16.6	8.93663	9.6281	3.42	4.32
	10	7 15.4	284	20 32 54.66	34 42.77	21 65 47.5	56 52.4	8.94042	9.6343	3.42	4.33
	11	7 13.6	285	20 35 0.74	36 49.94	21 55 22.7	46 19.2	8.94413	9.6404	3.41	4.32
	12	7 11.8	286	20 37 7.89	38 58.14	21 44 49.3	35 37.3	8.94776	9.6463	3.40	4.33
	13	7 10.0	287	20 39 16.10	41 7.86	21 34 7.1	24 46.6	8.95124	9.6523	3.38	4.33
	14	7 8.3	288	20 41 25.30	43 17.55	21 23 16.1	13 47.1	8.95446	9.6581	3.36	4.33
	15	7 6.5	289	20 43 35.43	45 28.65	21 12 16.3	2 38.8	8.95747	9.6639	3.33	4.33
	16	7 4.8	290	20 45 46.43	47 40.58	20 61 7.6	51 21.6	8.96027	9.6696	3.30	4.32
	17	7 3.0	291	20 47 58.25	49 53.31	20 49 50.4	39 55.8	8.96294	9.6751	3.28	4.32
	18	7 1.3	292	20 50 10.87	52 6.82	20 38 24.6	28 21.6	8.96554	9.6805	3.27	4.31
	19	6 59.6	293	20 52 24.28	54 21.10	20 26 50.5	16 39.0	8.96806	9.6857	3.25	4.31
	20	6 57.9	294	20 54 38.45	56 36.12	20 15 7.9	4 48.0	8.97048	9.6909	3.23	4.30
	21	6 56.3	295	20 56 53.35	58 51.84	19 63 17.0	52 48.7	8.97276	9.6960	3.21	4.30
	22	6 54.6	296	20 59 8.94	61 8.22	19 51 17.8	40 41.1	8.97492	9.7009	3.19	4.29
	23	6 52.9	297	21 1 25.19	3 25.22	19 39 10.5	28 25.4	8.97693	9.7058	3.17	4.29
	24	6 51.3	298	21 3 42.04	5 42.81	19 26 54.9	16 1.6	8.97882	9.7106	3.14	4.29
	25	6 49.7	299	21 5 59.48	8 0.95	19 14 31.3	3 29.8	8.98063	9.7153	3.12	4.28
	26	6 48.0	300	21 8 17.47	10 19.62	18 61 59.7	50 50.0	8.98229	9.7199	3.09	4.28
	27	6 46.4	301	21 10 35.97	12 38.79	18 49 20.2	38 2.3	8.98386	9.7244	3.07	4.28
	28	6 44.8	302	21 12 54.96	14 58.43	18 36 32.9	25 6.8	8.98537	9.7288	3.05	4.27
	29	6 43.2	303	21 15 14.43	17 18.52	18 23 37.8	12 3.6	8.98681	9.7332	3.03	4.27
	30	6 41.6	304	21 17 34.34	19 39.04	17 70 34.9	58 52.6	8.98817	9.7375	3.01	4.27
	31	6 40.0	305	21 19 54.69	21 59.99	17 57 24.2	45 33.8	8.98949	9.7417	2.99	4.26
	32	6 38.4	306	21 22 15.45	24 21.32	-17 44 5.9	32 7.4	+8.99072	+9.7459	+2.97	+4.26



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.				Apparent Declination.				Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.		At Transit.		At Sidereal Oh.		At Transit.		In R.A.	In Dec.	In R.A.	In Dec.
d.	h.	m.		h.	m.	s.	m.	°	'	"					
Nov. 1	6	38.4	306	21 22 15.45	24 21.32			-17	44	5.9	32 7.4	+8.99072	+9.7459	+2.97	+4.26
2	6	36.9	307	21 24 36.60	26 43.02			17	30	40.0	18 33.4	8.99187	9.7500	2.95	4.25
3	6	35.3	308	21 26 58.11	29 5.07			17	17	6.5	4 52.0	8.99296	9.7540	2.93	4.25
4	6	33.7	309	21 29 19.97	31 27.45			16	63	25.5	51 3.0	8.99400	9.7580	2.91	4.25
5	6	32.2	310	21 31 42.16	33 50.16			16	49	37.0	37 6.6	8.99500	9.7619	2.89	4.24
6	6	30.6	311	21 34 4.67	36 13.16			16	35	41.1	23 2.7	8.99596	9.7657	2.87	4.24
7	6	29.0	312	21 36 27.49	38 36.49			16	21	38.0	8 51.8	8.99688	9.7693	2.85	4.24
8	6	27.5	313	21 38 50.61	41 0.11			15	67	27.9	54 34.0	8.99778	9.7729	2.84	4.23
9	6	26.0	314	21 41 14.02	43 24.02			15	53	10.9	40 9.4	8.99864	9.7763	2.82	4.22
10	6	24.4	315	21 43 37.71	45 48.19			15	38	47.1	25 38.1	8.99944	9.7797	2.80	4.21
11	6	22.9	316	21 46 1.65	48 12.62			15	24	16.7	11 0.2	9.00018	9.7830	2.78	4.20
12	6	21.4	317	21 48 25.83	50 37.27			14	69	39.7	56 15.8	9.00091	9.7862	2.76	4.19
13	6	19.9	318	21 50 50.26	53 2.14			14	54	56.2	41 25.0	9.00163	9.7894	2.72	4.18
14	6	18.8	319	21 53 14.91	55 27.23			14	40	6.2	26 27.8	9.00230	9.7925	2.70	4.17
15	6	16.8	320	21 55 39.78	57 52.53			14	25	10.0	11 24.4	9.00292	9.7955	2.68	4.17
16	6	15.3	321	21 58 4.85	60 18.02			13	70	7.6	56 14.9	9.00351	9.7985	2.66	4.17
17	6	13.8	322	22 0 30.11	2 43.69			13	54	59.0	40 59.4	9.00405	9.8014	2.63	4.16
18	6	12.3	323	22 2 55.55	5 9.52			13	39	44.5	25 38.0	9.00455	9.8042	2.61	4.15
19	6	10.8	324	22 5 21.15	7 35.51			13	24	24.3	10 11.0	9.00502	9.8068	2.59	4.13
20	6	9.3	325	22 7 46.90	10 1.64			12	68	58.6	54 28.6	9.00547	9.8095	2.56	4.13
21	6	7.8	326	22 10 12.80	12 27.90			12	53	27.3	39 0.8	9.00589	9.8121	2.53	4.13
22	6	6.3	327	22 12 38.83	14 54.28			12	37	50.3	23 17.2	9.00627	9.8146	2.50	4.12
23	6	4.8	328	22 15 4.99	17 20.78			12	22	7.9	7 28.3	9.00662	9.8171	2.40	4.11
24	6	3.3	329	22 17 31.25	19 47.38			11	66	20.2	51 34.2	9.00692	9.8195	2.35	4.10
25	6	1.8	330	22 19 57.61	22 14.07			11	50	27.3	35 35.0	9.00717	9.8219	2.24	4.09
26	6	0.3	331	22 22 24.04	24 40.82			11	34	29.3	19 30.8	9.00735	9.8241	2.16	4.07
27	5	58.8	332	22 24 50.52	27 7.61			11	18	26.5	3 21.9	9.00748	9.8263	2.15	4.06
28	5	57.3	333	22 27 17.04	29 34.43			10	62	18.9	47 8.4	9.00763	9.8283	2.15	4.04
29	5	55.8	334	22 29 43.61	32 1.30			10	46	6.9	30 50.6	9.00777	9.8303	2.16	4.03
30	5	54.3	335	22 32 10.24	34 28.22			10	29	50.4	14 28.3	9.00795	9.8322	2.15	4.02
Dec. 1	5	52.8	336	22 34 36.93	36 55.20			9	73	29.6	58 1.9	9.00813	9.8341	2.14	4.00
2	5	51.4	337	22 37 3.68	39 22.24			9	57	4.8	41 31.6	9.00827	9.8359	2.10	3.99
3	5	49.9	338	22 39 30.47	41 49.33			9	40	35.9	24 57.3	9.00842	9.8376	2.09	3.97
4	5	48.4	339	22 41 57.31	44 16.48			9	24	3.1	8 19.2	9.00856	9.8393	2.08	3.96
5	5	46.9	340	22 44 24.20	46 43.67			8	67	26.6	51 37.5	9.00871	9.8409	2.08	3.94
6	5	45.4	341	22 46 51.14	49 10.91			8	50	46.5	34 52.3	9.00886	9.8425	2.08	3.93
7	5	43.9	342	22 49 18.14	51 38.21			8	34	2.9	18 3.7	9.00902	9.8440	2.08	3.92
8	5	42.5	343	22 51 45.18	54 5.55			8	17	15.8	1 11.7	9.00917	9.8454	2.06	3.90
9	5	41.0	344	22 54 12.28	56 32.95			7	60	25.4	44 16.5	9.00933	9.8468	2.05	3.87
10	5	39.5	345	22 56 39.43	59 0.39			7	43	31.8	27 18.2	9.00946	9.8482	2.03	3.86
11	5	38.1	346	22 59 6.62	61 27.88			7	26	35.1	10 16.8	9.00959	9.8495	+2.00	3.85
12	5	36.5	347	23 1 33.86	3 55.41			6	69	35.3	53 12.6	9.00972	9.8507		3.83
13	5	35.1	348	23 4 1.14	6 22.97			6	52	32.8	36 5.7	9.00984	9.8519		3.80
14	5	33.6	349	23 6 28.46	8 50.57			6	35	27.5	18 56.3	9.00994	9.8530		3.78
15	5	32.1	350	23 8 55.80	11 18.21			6	18	19.7	1 44.5	9.01003	9.8540		3.75
16	5	30.6	351	23 11 23.19	13 45.88			5	61	9.6	44 30.6	9.01015	9.8550		3.73
17	5	29.1	352	23 13 50.61	16 13.61			5	43	57.4	27 14.5	9.01028	9.8559		3.70
18	5	27.7	353	23 16 18.09	18 41.38			5	26	43.1	9 56.6	9.01042	9.8567		3.66
19	5	26.3	354	23 18 45.62	21 9.20			4	69	26.9	52 36.8	9.01056	9.8574		3.63
20	5	24.7	355	23 21 13.18	23 37.04			4	52	9.0	35 15.3	9.01066	9.8582		3.60
21	5	23.2	356	23 23 40.77	26 4.94			4	34	49.3	17 52.1	9.01077	9.8589		3.57
22	5	21.8	357	23 26 8.41	28 32.85			4	17	28.0	0 27.9	9.01087	9.8595		3.50
23	5	20.3	358	23 28 36.07	31 0.81			3	60	5.5	43 2.5	9.01096	9.8599		3.44
24	5	18.8	359	23 31 3.77	33 28.77			3	42	42.0	25 36.4	9.01105	9.8603		3.39
25	5	17.4	360	23 33 31.49	35 56.78			3	25	17.5	8 9.2	9.01114	9.8607		3.33
26	5	15.9	361	23 35 59.25	38 24.82			2	67	52.1	50 41.4	9.01124	9.8611		3.28
27	5	14.4	362	23 38 27.04	40 52.89			2	50	25.8	33 12.7	9.01133	9.8614		3.23
28	5	12.9	363	23 40 54.86	43 20.99			2	32	58.9	15 43.4	9.01141	9.8617		3.20
29	5	11.5	364	23 43 22.71	45 49.12			1	75	31.3	58 18.4	9.01149	9.8620		3.16
30	5	10.0	365	23 45 50.58	48 17.29			1	58	3.1	40 43.1	9.01158	9.8622		+3.00
31	5	8.5	366	23 48 18.49	50 45.49			1	40	34.5	23 12.4	9.01167	9.8623		
32	5	7.1	367	23 50 46.42	53 13.70			-1	23	5.6	5 41.5	+9.01175	+9.8624		



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
Jan. d. h. m.		h. m. s.	m. s.	° ' "	' "				
0 12 52.8	0	7 33 31.72	33 21.32	+22 0 48.4	1 14.3	-8.3597	+8.7581	-2.80	
1 12 48.3	1	7 32 58.63	32 48.12	22 2 10.9	2 36.7	8.3630	8.7581	2.75	
2 12 43.9	2	7 32 25.30	32 14.78	22 3 33.3	3 59.2	8.3659	8.7575	2.72	
3 12 39.4	3	7 31 51.75	31 41.18	22 4 55.7	5 21.5	8.3685	8.7571	2.67	
4 12 34.9	4	7 31 18.02	31 7.41	22 6 18.0	6 43.7	8.3708	8.7565	2.61	
5 12 30.4	5	7 30 44.12	30 33.47	22 7 40.2	8 5.7	8.3728	8.7556	2.55	
6 12 25.9	6	7 30 10.07	29 59.39	22 9 2.1	9 27.6	8.3745	8.7543	2.46	
7 12 21.4	7	7 29 35.91	29 25.21	22 10 23.8	10 49.2	8.3759	8.7527	-2.84	
8 12 16.9	8	7 29 1.65	28 50.95	22 11 45.1	12 10.4	8.3769	8.7506		
9 12 12.4	9	7 28 27.33	28 16.63	22 13 6.0	13 31.1	8.3776	8.7481		
10 12 7.9	10	7 27 52.96	27 42.28	22 14 26.4	14 51.3	8.3780	8.7453		
11 12 3.4	11	7 27 18.58	27 7.92	22 15 46.3	16 11.0	8.3780	8.7423		
12 11 58.9	12	7 26 44.21	26 33.57	22 17 5.6	17 30.1	8.3777	8.7390		
13 11 54.4	13	7 26 9.88	25 59.27	22 18 24.2	18 48.5	8.3770	8.7355		
14 11 49.9	14	7 25 35.61	25 25.04	22 19 42.2	20 6.2	8.3761	8.7317	+2.29	
15 11 45.4	15	7 25 1.42	24 50.90	22 20 59.5	21 23.2	8.3749	8.7275	2.42	
16 11 40.9	16	7 24 27.34	24 16.88	22 22 16.0	22 39.4	8.3733	8.7230	2.53	-3.31
17 11 36.4	17	7 23 53.40	23 43.01	22 23 31.7	23 54.8	8.3714	8.7180	2.60	3.33
18 11 31.9	18	7 23 19.62	23 9.30	22 24 46.5	25 9.3	8.3691	8.7127	2.66	3.35
19 11 27.4	19	7 22 46.03	22 35.79	22 26 0.3	26 22.8	8.3665	8.7070	2.71	3.37
20 11 22.9	20	7 22 12.66	22 2.51	22 27 13.2	27 35.3	8.3635	8.7011	2.76	3.38
21 11 18.4	21	7 21 39.53	21 29.48	22 28 25.1	28 46.8	8.3603	8.6948	2.81	3.40
22 11 13.9	22	7 21 6.66	20 56.71	22 29 35.9	29 57.3	8.3566	8.6883	2.85	3.42
23 11 9.4	23	7 20 34.08	20 24.24	22 30 45.7	31 6.7	8.3526	8.6815	2.89	3.43
24 11 5.0	24	7 20 1.82	19 52.09	22 31 54.3	32 14.9	8.3481	8.6743	2.92	3.44
25 11 0.5	25	7 19 29.91	19 20.30	22 33 1.7	33 21.9	8.3433	8.6668	2.95	3.46
26 10 56.0	26	7 18 58.36	18 48.89	22 34 8.0	34 27.8	8.3380	8.6589	2.98	3.47
27 10 51.6	27	7 18 27.21	18 17.87	22 35 13.0	35 32.4	8.3323	8.6507	3.01	3.48
28 10 47.2	28	7 17 56.47	17 47.27	22 36 16.8	36 35.8	8.3262	8.6420	3.03	3.49
29 10 42.8	29	7 17 26.17	17 17.12	22 37 19.3	37 37.9	8.3197	8.6329	3.05	3.50
30 10 38.4	30	7 16 56.34	16 47.44	22 38 20.4	38 38.6	8.3128	8.6234	3.07	3.51
31 10 34.0	31	7 16 26.99	16 18.24	22 39 20.2	39 38.0	8.3056	8.6134	3.09	3.52
Feb. 1 10 29.6	32	7 15 58.14	15 49.55	22 40 18.6	40 36.0	8.2979	8.6032	3.10	3.52
2 10 25.2	33	7 15 29.81	15 21.39	22 41 15.6	41 32.6	8.2899	8.5926	3.12	3.53
3 10 20.8	34	7 15 2.01	14 53.76	22 42 11.3	42 27.9	8.2814	8.5816	3.13	3.53
4 10 16.4	35	7 14 34.76	14 26.68	22 43 5.6	43 21.8	8.2724	8.5703	3.14	3.53
5 10 12.0	36	7 14 8.09	14 0.19	22 43 58.4	44 14.2	8.2630	8.5586	3.15	3.54
6 10 7.6	37	7 13 42.00	13 34.29	22 44 49.8	45 5.1	8.2531	8.5466	3.17	3.54
7 10 3.3	38	7 13 16.52	13 9.00	22 45 39.8	45 54.6	8.2426	8.5342	3.18	3.54
8 9 59.0	39	7 12 51.66	12 44.34	22 46 28.4	46 42.7	8.2316	8.5214	3.19	3.54
9 9 54.7	40	7 12 27.43	12 20.31	22 47 15.5	47 29.4	8.2201	8.5081	3.20	3.55
10 9 50.4	41	7 12 3.85	11 56.94	22 48 1.2	48 14.7	8.2080	8.4943	3.21	3.55
11 9 46.1	42	7 11 40.94	11 34.24	22 48 45.5	48 58.5	8.1953	8.4801	3.22	3.55
12 9 41.8	43	7 11 18.71	11 12.22	22 49 28.3	49 40.8	8.1819	8.4654	3.23	3.55
13 9 37.5	44	7 10 57.17	10 50.90	22 50 9.6	50 21.7	8.1678	8.4501	3.23	3.55
14 9 33.2	45	7 10 36.34	10 30.99	22 50 49.4	51 1.1	8.1530	8.4343	3.24	3.55
15 9 28.9	46	7 10 16.22	10 10.39	22 51 27.8	51 39.0	8.1373	8.4177	3.25	3.55
16 9 24.6	47	7 9 56.83	9 51.22	22 52 4.7	52 15.5	8.1208	8.4004	3.26	3.55
17 9 20.4	48	7 9 38.19	9 32.81	22 52 40.2	52 50.5	8.1033	8.3823	3.26	3.55
18 9 16.2	49	7 9 20.30	9 15.16	22 53 14.2	53 24.0	8.0848	8.3634	3.27	3.55
19 9 12.0	50	7 9 3.18	8 58.27	22 53 46.7	53 56.1	8.0653	8.3437	3.27	3.55
20 9 7.8	51	7 8 46.83	8 42.16	22 54 17.7	54 26.7	8.0446	8.3230	3.28	3.55
21 9 3.6	52	7 8 31.27	8 26.83	22 54 47.3	54 55.8	8.0226	8.3014	3.28	3.55
22 8 59.4	53	7 8 16.50	8 12.30	22 55 15.4	55 23.4	7.9992	8.2787	3.29	3.55
23 8 55.2	54	7 8 2.53	7 58.57	22 55 42.0	55 49.6	7.9742	8.2547	3.29	3.55
24 8 51.0	55	7 7 49.37	7 45.65	22 56 7.1	56 14.3	7.9473	8.2293	3.30	3.55
25 8 46.9	56	7 7 37.03	7 33.55	22 56 30.8	56 37.5	7.9183	8.2024	3.30	3.55
26 8 42.8	57	7 7 25.51	7 22.28	22 56 53.0	56 59.3	7.8873	8.1737	3.30	3.55
27 8 38.7	58	7 7 14.82	7 11.84	22 57 13.8	57 19.6	7.8538	8.1431	3.31	3.54
28 8 34.6	59	7 7 4.95	7 2.23	22 57 33.1	57 38.5	7.8172	8.1103	3.31	3.54
29 8 30.5	60	7 6 55.92	6 53.44	22 57 50.9	57 55.9	7.7771	8.0752	3.31	3.54
30 8 26.4	61	7 6 47.72	6 45.48	+22 58 7.3	58 11.9	-7.7326	+8.0371	+3.31	-3.54



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.				h. m. s.	m. s.	° ' "	' "				
Mar. 1	8 26.4	61		7 6 47.72	6 45.48	+22 58 7.3	58 11.9	-7.7326	+8.0371	+3.31	-3.54
2	8 22.3	62		7 6 40.36	6 38.37	22 58 22.3	58 26.4	7.6831	7.9954	3.31	3.53
3	8 18.3	63		7 6 33.84	6 32.10	22 58 35.9	58 39.6	7.6266	7.9503	3.31	3.53
4	8 14.3	64		7 6 28.16	6 26.67	22 58 48.0	58 51.3	7.5622	7.9004	3.31	3.53
5	8 10.3	65		7 6 23.32	6 22.07	22 58 58.7	59 1.6	7.4865	7.8442	3.31	3.52
6	8 6.3	66		7 6 19.32	6 18.32	22 59 8.0	59 10.5	7.3949	7.7798	3.31	3.52
7	8 2.3	67		7 6 16.16	6 15.41	22 59 15.9	59 18.0	7.2789	7.7041	3.31	3.51
8	7 58.3	68		7 6 13.83	6 13.33	22 59 22.5	59 24.2	7.1204	7.6125	3.31	3.51
9	7 54.4	69		7 6 12.33	6 12.08	22 59 27.7	59 29.0	6.8687	7.4968	3.31	3.51
10	7 50.5	70		7 6 11.67	6 11.67	22 59 31.5	59 32.4	-6.2034	7.3399	3.31	3.51
11	7 46.6	71		7 6 11.85	6 12.10	22 59 34.0	59 34.5	+6.6222	7.0933	3.31	3.51
12	7 42.7	72		7 6 12.86	6 13.36	22 59 35.1	59 35.2	6.9984	+6.4700	3.30	3.51
13	7 38.8	73		7 6 14.71	6 15.45	22 59 34.8	59 34.5	7.1963	-6.8148	3.30	3.51
14	7 34.9	74		7 6 17.39	6 18.38	22 59 33.2	59 32.5	7.3316	7.2034	3.30	3.51
15	7 31.0	75		7 6 20.90	6 22.13	22 59 30.2	59 29.1	7.4345	7.4057	3.30	3.51
16	7 27.1	76		7 6 25.23	6 26.70	22 59 25.9	59 24.4	7.5174	7.5427	3.30	3.51
17	7 23.3	77		7 6 30.38	6 32.09	22 59 20.2	59 18.3	7.5870	7.6472	3.30	3.51
18	7 19.5	78		7 6 36.36	6 38.31	22 59 13.2	59 10.9	7.6468	7.7309	3.30	3.51
19	7 15.7	79		7 6 43.16	6 45.35	22 59 4.8	59 2.1	7.6992	7.8007	3.29	3.51
20	7 11.9	80		7 6 50.77	6 53.20	22 58 55.0	58 51.9	7.7458	7.8607	3.29	3.51
21	7 8.1	81		7 6 59.20	7 1.87	22 58 43.9	58 40.4	7.7877	7.9134	3.29	3.51
22	7 4.3	82		7 7 8.44	7 11.35	22 58 31.4	58 27.5	7.8257	7.9606	3.29	3.51
23	7 0.5	83		7 7 18.49	7 21.64	22 58 17.6	58 13.3	7.8605	8.0033	3.28	3.51
24	6 56.8	84		7 7 29.33	7 32.72	22 58 2.4	57 57.7	7.8923	8.0424	3.28	3.51
25	6 53.1	85		7 7 40.97	7 44.59	22 57 45.8	57 40.7	7.9219	8.0784	3.28	3.51
26	6 49.4	86		7 7 53.39	7 57.24	22 57 27.9	57 22.3	7.9493	8.1117	3.27	3.51
27	6 45.7	87		7 8 6.59	8 10.67	22 57 8.6	57 2.6	7.9750	8.1428	3.27	3.51
28	6 42.0	88		7 8 20.57	8 24.88	22 56 47.9	56 41.5	7.9988	8.1715	3.26	3.51
29	6 38.3	89		7 8 35.31	8 39.85	22 56 25.9	56 19.1	8.0211	8.1985	3.26	3.51
30	6 34.6	90		7 8 50.80	8 55.57	22 56 2.5	55 55.3	8.0423	8.2236	3.26	3.51
31	6 30.9	91		7 9 7.04	9 12.03	22 55 37.7	55 30.1	8.0623	8.2476	3.25	3.51
Apr. 1	6 27.3	92		7 9 24.03	9 29.24	22 55 11.6	55 3.6	8.0813	8.2702	3.25	3.52
2	6 23.7	93		7 9 41.76	9 47.19	22 54 44.1	54 35.7	8.0992	8.2912	3.25	3.52
3	6 20.1	94		7 10 0.21	10 5.86	22 54 15.3	54 6.5	8.1161	8.3110	3.24	3.52
4	6 16.5	95		7 10 19.38	10 25.25	22 53 45.2	53 36.0	8.1322	8.3302	3.24	3.52
5	6 12.9	96		7 10 39.26	10 45.35	22 53 13.7	53 4.1	8.1476	8.3488	3.23	3.52
6	6 9.3	97		7 10 59.84	11 6.15	22 52 40.9	52 30.8	8.1624	8.3666	3.23	3.52
7	6 5.7	98		7 11 21.12	11 27.64	22 52 6.7	51 56.2	8.1766	8.3838	3.22	3.52
8	6 2.1	99		7 11 43.09	11 49.82	22 51 31.2	51 20.3	8.1902	8.4006	3.22	3.53
9	5 58.5	100		7 12 5.74	12 12.68	22 50 54.3	50 42.9	8.2033	8.4168	3.21	3.53
10	5 55.0	101		7 12 29.07	12 36.22	22 50 16.0	50 4.2	8.2158	8.4327	3.21	3.53
11	5 51.5	102		7 12 53.07	13 0.42	22 49 36.3	49 24.1	8.2279	8.4480	3.20	3.53
12	5 48.0	103		7 13 17.73	13 25.29	22 48 55.2	48 42.6	8.2395	8.4628	3.20	3.53
13	5 44.5	104		7 13 43.05	13 50.81	22 48 12.7	47 59.7	8.2507	8.4771	3.19	3.53
14	5 41.0	105		7 14 9.02	14 16.98	22 47 28.9	47 15.4	8.2615	8.4909	3.19	3.53
15	5 37.5	106		7 14 35.63	14 43.79	22 46 43.6	46 29.6	8.2719	8.5044	3.18	3.53
16	5 34.0	107		7 15 2.87	15 11.23	22 45 56.9	45 42.5	8.2819	8.5176	3.18	3.54
17	5 30.5	108		7 15 30.74	15 39.29	22 45 8.8	44 53.9	8.2915	8.5305	3.17	3.54
18	5 27.0	109		7 15 59.22	16 7.97	22 44 19.2	44 3.9	8.3009	8.5432	3.17	3.54
19	5 23.6	110		7 16 28.32	16 37.26	22 43 28.2	43 12.4	8.3100	8.5555	3.16	3.54
20	5 20.2	111		7 16 58.02	17 7.15	22 42 35.7	42 19.5	8.3188	8.5675	3.16	3.54
21	5 16.8	112		7 17 28.32	17 37.64	22 41 41.8	41 25.1	8.3272	8.5792	3.15	3.54
22	5 13.4	113		7 17 59.21	18 8.72	22 40 46.4	40 29.3	8.3355	8.5906	3.15	3.54
23	5 10.0	114		7 18 30.67	18 40.36	22 39 49.6	39 32.0	8.3435	8.6017	3.14	3.55
24	5 6.6	115		7 19 2.70	19 12.57	22 38 51.3	38 33.2	8.3511	8.6124	3.13	3.55
25	5 3.2	116		7 19 35.30	19 45.35	22 37 51.6	37 33.0	8.3585	8.6229	3.12	3.55
26	4 59.8	117		7 20 8.45	20 18.68	22 36 50.4	36 31.4	8.3657	8.6332	3.12	3.55
27	4 56.4	118		7 20 42.14	20 52.55	22 35 47.8	35 28.3	8.3726	8.6433	3.11	3.55
28	4 53.0	119		7 21 16.36	21 26.95	22 34 43.7	34 23.7	8.3792	8.6533	3.11	3.56
29	4 49.7	120		7 21 51.11	22 1.87	22 33 38.1	33 17.7	8.3858	8.6631	3.10	3.56
30	4 46.3	121		7 22 26.37	22 37.30	22 32 31.1	32 10.2	8.3921	8.6728	3.09	3.56
31	4 43.0	122		7 23 2.14	23 13.24	+22 31 22.6	31 1.2	+8.3982	-8.6824	+3.08	-3.56



FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.											
Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> <sup>2</sup> .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.				h. m. s.	m. s.	° ' "	° ' "				
May 1 4 43.0	122	7 23 2.14	23 13.24	+22 31 22.6	31 1.2	+8.3982	-8.6824	+3.08	-3.56		
2 4 39.7	123	7 23 38.41	23 49.68	22 30 12.5	29 50.6	8.4041	8.6917	3.08	3.56		
3 4 36.4	124	7 24 15.17	24 26.61	22 29 1.0	28 38.5	8.4099	8.7008	3.07	3.56		
4 4 33.1	125	7 24 52.41	25 4.02	22 27 47.9	27 25.0	8.4155	8.7097	3.06	3.57		
5 4 29.8	126	7 25 30.13	25 41.90	22 26 33.4	26 10.0	8.4209	8.7184	3.05	3.57		
6 4 26.5	127	7 26 8.32	26 20.25	22 25 17.4	24 53.5	8.4261	8.7270	3.05	3.57		
7 4 23.2	128	7 26 46.96	26 59.05	22 23 59.9	23 35.5	8.4312	8.7354	3.04	3.57		
8 4 19.9	129	7 27 26.06	27 38.30	22 22 40.8	22 16.0	8.4363	8.7435	3.04	3.57		
9 4 16.6	130	7 28 5.60	28 18.00	22 21 20.3	20 54.9	8.4412	8.7515	3.03	3.57		
10 4 13.3	131	7 28 45.58	28 58.14	22 19 58.8	19 32.3	8.4459	8.7595	3.02	3.57		
11 4 10.0	132	7 29 26.00	29 38.71	22 18 34.7	18 8.2	8.4505	8.7675	3.01	3.57		
12 4 6.8	133	7 30 6.84	30 19.70	22 17 9.6	16 42.6	8.4550	8.7754	3.01	3.57		
13 4 3.6	134	7 30 48.10	31 1.11	22 15 43.0	15 15.5	8.4594	8.7831	3.00	3.57		
14 4 0.4	135	7 31 29.77	31 42.93	22 14 14.8	13 46.8	8.4637	8.7907	2.99	3.58		
15 3 57.2	136	7 32 11.85	32 25.15	22 12 45.0	12 16.5	8.4678	8.7981	2.98	3.58		
16 3 54.0	137	7 32 54.33	33 7.77	22 11 13.7	10 44.6	8.4718	8.8054	2.98	3.58		
17 3 50.8	138	7 33 37.19	33 50.77	22 9 40.8	9 11.2	8.4757	8.8127	2.97	3.58		
18 3 47.6	139	7 34 20.44	34 34.16	22 8 6.4	7 36.2	8.4795	8.8200	2.96	3.58		
19 3 44.4	140	7 35 4.06	35 17.92	22 6 30.4	5 59.7	8.4832	8.8272	2.95	3.58		
20 3 41.2	141	7 35 48.05	36 2.05	22 4 52.8	4 21.6	8.4869	8.8343	2.94	3.58		
21 3 38.0	142	7 36 32.41	36 46.54	22 3 13.7	2 41.9	8.4904	8.8413	2.93	3.57		
22 3 34.8	143	7 37 17.12	37 31.39	22 1 33.0	1 0.7	8.4938	8.8481	2.92	3.57		
23 3 31.6	144	7 38 2.18	38 16.58	21 59 50.7	59 17.9	8.4971	8.8547	2.91	3.57		
24 3 28.4	145	7 38 47.58	39 2.11	21 58 6.9	57 33.5	8.5003	8.8611	2.90	3.57		
25 3 25.2	146	7 39 33.30	39 47.96	21 56 21.5	55 47.5	8.5034	8.8675	2.89	3.57		
26 3 22.0	147	7 40 19.35	40 34.18	21 54 34.5	54 0.0	8.5064	8.8738	2.88	3.57		
27 3 18.8	148	7 41 5.71	41 20.62	21 52 46.0	52 10.9	8.5093	8.8801	2.86	3.57		
28 3 15.6	149	7 41 52.38	42 7.41	21 50 55.9	50 20.3	8.5121	8.8862	2.85	3.57		
29 3 12.5	150	7 42 39.34	42 54.49	21 49 4.3	48 28.1	8.5148	8.8922	2.84	3.57		
30 3 9.4	151	7 43 26.59	43 41.86	21 47 11.1	46 34.3	8.5174	8.8981	2.83	3.57		
31 3 6.3	152	7 44 14.13	44 29.52	21 45 16.4	44 39.0	8.5200	8.9040	2.82	3.57		
June 1 3 3.1	153	7 45 1.95	45 17.46	21 43 20.1	42 42.2	8.5225	8.9098	2.81	3.57		
2 2 59.9	154	7 45 50.04	46 5.67	21 41 22.3	40 43.8	8.5249	8.9155	2.80	3.57		
3 2 56.8	155	7 46 38.40	46 54.14	21 39 23.0	38 43.9	8.5273	8.9211	2.79	3.57		
4 2 53.7	156	7 47 27.01	47 42.86	21 37 22.1	36 42.5	8.5296	8.9267	2.78	3.57		
5 2 50.6	157	7 48 15.88	48 31.84	21 35 19.7	34 39.5	8.5318	8.9322	2.77	3.57		
6 2 47.5	158	7 49 5.00	49 21.07	21 33 15.7	32 34.9	8.5340	8.9375	2.76	3.57		
7 2 44.4	159	7 49 54.37	50 10.55	21 31 10.2	30 28.8	8.5361	8.9428	2.75	3.56		
8 2 41.3	160	7 50 43.98	51 0.26	21 29 3.1	28 21.1	8.5382	8.9480	2.74	3.56		
9 2 38.2	161	7 51 33.82	51 50.20	21 26 54.4	26 11.9	8.5402	8.9532	2.73	3.56		
10 2 35.1	162	7 52 23.88	52 40.36	21 24 44.3	24 1.2	8.5421	8.9584	2.72	3.56		
11 2 32.0	163	7 53 14.16	53 30.74	21 22 32.7	21 49.0	8.5439	8.9635	2.71	3.56		
12 2 28.9	164	7 54 4.65	54 21.33	21 20 19.5	19 35.3	8.5457	8.9685	2.70	3.56		
13 2 25.8	165	7 54 55.36	55 12.18	21 18 4.8	17 20.0	8.5475	8.9735	2.69	3.56		
14 2 22.7	166	7 55 46.27	56 3.14	21 15 48.5	15 3.1	8.5492	8.9784	2.68	3.56		
15 2 19.6	167	7 56 37.38	56 54.35	21 13 30.7	12 44.7	8.5509	8.9833	2.67	3.55		
16 2 16.6	168	7 57 28.68	57 45.74	21 11 11.4	10 24.8	8.5525	8.9881	2.66	3.55		
17 2 13.5	169	7 58 20.17	58 37.32	21 8 50.6	8 8.5	8.5540	8.9927	2.64	3.55		
18 2 10.4	170	7 59 11.84	59 29.08	21 6 28.3	5 40.6	8.5555	8.9972	2.63	3.55		
19 2 7.4	171	8 0 3.68	0 21.01	21 4 4.5	3 16.2	8.5569	9.0017	2.61	3.54		
20 2 4.3	172	8 0 55.69	1 13.10	21 1 39.2	0 50.4	8.5583	9.0061	2.60	3.54		
21 2 1.3	173	8 1 47.86	2 5.35	20 59 12.5	58 23.1	8.5597	9.0104	2.58	3.54		
22 1 58.2	174	8 2 40.18	2 57.75	20 56 44.3	55 54.3	8.5610	9.0147	2.56	3.54		
23 1 55.2	175	8 3 32.65	3 50.30	20 54 14.6	53 24.0	8.5622	9.0189	2.54	3.53		
24 1 52.1	176	8 4 25.26	4 42.99	20 51 43.5	50 52.3	8.5633	9.0231	2.52	3.53		
25 1 49.0	177	8 5 18.01	5 35.83	20 49 11.0	48 19.2	8.5644	9.0272	2.50	3.53		
26 1 46.0	178	8 6 10.89	6 28.78	20 46 37.0	45 44.7	8.5654	9.0312	2.48	3.52		
27 1 42.9	179	8 7 3.89	7 21.85	20 44 1.6	43 8.7	8.5664	9.0351	2.46	3.52		
28 1 39.9	180	8 7 57.00	8 15.03	20 41 24.8	40 31.3	8.5673	9.0388	2.44	3.52		
29 1 36.8	181	8 8 50.22	9 8.32	20 38 46.7	37 52.6	8.5682	9.0425	2.41	3.52		
30 1 33.8	182	8 9 43.55	10 1.73	20 36 7.2	35 12.6	8.5691	9.0462	2.38	3.51		
31 1 30.7	183	8 10 36.99	10 55.23	+20 33 26.4	32 31.3	+8.5699	-9.0498	+2.35	-3.51		



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
July	d.	h. m.		h. m. s.	m. s.	° ' "	° ' "				
	1	30.7	183	8 10 36.99	10 55.23	+20 33 26.4	32 31.3	+8.5699	-9.0498	+2.35	-3.51
	2	27.7	184	8 11 30.52	11 48.83	20 30 44.2	29 48.5	8.5707	9.0634	+2.31	3.51
	3	24.7	185	8 12 24.15	12 42.52	20 28 0.6	27 4.4	8.5714	9.0670		3.51
	4	21.6	186	8 13 17.86	13 36.30	20 25 15.7	24 19.0	8.5721	9.0605		3.51
	5	18.6	187	8 14 11.66	14 30.16	20 22 29.6	21 32.3	8.5728	9.0640		3.50
	6	15.6	188	8 15 5.54	15 24.10	20 19 42.1	18 44.2	8.5734	9.0675		3.50
	7	12.6	189	8 15 59.50	16 18.12	20 16 53.2	15 54.8	8.5740	9.0709		3.50
	8	9.5	190	8 16 53.53	17 12.21	20 14 3.0	13 4.0	8.5745	9.0742		3.49
	9	6.5	191	8 17 47.63	18 6.36	20 11 11.6	10 12.0	8.5750	9.0775		3.49
	10	3.5	192	8 18 41.79	19 0.57	20 8 18.9	7 18.7	8.5755	9.0807		3.48
	11	0.5	193	8 19 36.00	19 54.83	20 5 24.9	4 24.2	8.5760	9.0838		3.48
	12	0 57.4	194	8 20 30.27	20 49.15	20 2 29.7	1 28.5	8.5764	9.0868		3.47
	13	0 54.4	195	8 21 24.58	21 43.51	19 59 33.3	58 31.6	8.5768	9.0898		3.47
	14	0 51.4	196	8 22 18.94	22 37.92	19 56 35.6	55 33.4	8.5771	9.0927		3.46
	15	0 48.4	197	8 23 13.33	23 32.36	19 53 36.8	52 34.0	8.5774	9.0956		3.46
	16	0 45.3	198	8 24 7.76	24 26.83	19 50 36.8	49 33.5	8.5776	9.0984		3.45
	17	0 42.3	199	8 25 2.21	25 21.32	19 47 35.6	46 31.8	8.5778	9.1012		3.44
	18	0 39.3	200	8 25 56.68	26 15.83	19 44 33.3	43 29.0	8.5779	9.1039		3.43
	19	0 36.3	201	8 26 51.16	27 10.35	19 41 29.8	40 25.0	8.5780	9.1065		3.42
	20	0 33.2	202	8 27 45.65	28 4.88	19 38 25.2	37 19.9	8.5780	9.1091		3.41
	21	0 30.2	203	8 28 40.15	28 59.41	19 35 19.6	34 13.8	8.5780	9.1116		3.40
	22	0 27.2	204	8 29 34.65	29 53.94	19 32 12.9	31 6.6	8.5780	9.1141		3.39
	23	0 24.2	205	8 30 29.14	30 48.46	19 29 5.1	27 58.3	8.5780	9.1165		3.39
	24	0 21.1	206	8 31 23.62	31 42.97	19 25 56.3	24 49.0	8.5779	9.1188		3.38
	25	0 18.1	207	8 32 18.09	32 37.47	19 22 46.5	21 38.7	8.5778	9.1211		3.37
	26	0 15.1	208	8 33 12.53	33 31.94	19 19 35.7	18 27.5	8.5776	9.1233		3.36
	27	0 12.0	209	8 34 6.95	34 26.38	19 16 24.0	15 15.3	8.5774	9.1254		3.35
	28	0 9.0	210	8 35 1.33	35 20.79	19 13 11.3	12 2.2	8.5771	9.1275		3.34
	29	0 6.0	211	8 35 55.68	36 15.16	19 9 57.8	8 48.2	8.5768	9.1295		3.33
	30	0 2.9	212	8 36 49.99	37 9.49	19 6 43.4	5 33.3	8.5764	9.1314		-3.32
	30 23 59.9		213	8 37 44.26	38 3.78	19 3 28.1	2 17.6	8.5760	9.1333		
	31 23 56.8		214	8 38 38.48	38 58.02	19 0 11.9	59 1.0	8.5756	9.1352		
Aug.	1 23 53.8		215	8 39 32.64	39 52.20	18 56 54.9	55 43.6	8.5751	9.1370		
	2 23 50.8		216	8 40 26.75	40 46.32	18 53 37.0	52 25.3	8.5747	9.1388		
	3 23 47.7		217	8 41 20.80	41 40.38	18 50 18.4	49 6.3	8.5742	9.1405		
	4 23 44.7		218	8 42 14.79	42 34.38	18 46 59.0	45 46.5	8.5737	9.1422		
	5 23 41.7		219	8 43 8.71	43 28.31	18 43 38.8	42 25.9	8.5732	9.1438		
	6 23 38.6		220	8 44 2.56	44 22.17	18 40 17.9	39 4.6	8.5727	9.1454		
	7 23 35.6		221	8 44 56.34	45 15.96	18 36 56.2	35 42.5	8.5721	9.1470	-2.30	
	8 23 32.5		222	8 45 50.04	46 9.66	18 33 33.8	32 19.7	8.5714	9.1485	2.33	
	9 23 29.5		223	8 46 43.66	47 3.28	18 30 10.8	28 56.3	8.5707	9.1499	2.36	
	10 23 26.4		224	8 47 37.19	47 56.81	18 26 47.1	25 32.3	8.5699	9.1513	2.38	
	11 23 23.4		225	8 48 30.62	48 50.24	18 23 22.8	22 7.6	8.5691	9.1526	2.40	
	12 23 20.3		226	8 49 23.96	49 43.57	18 19 57.9	18 42.4	8.5683	9.1538	2.42	
	13 23 17.3		227	8 50 17.19	50 36.80	18 16 32.4	15 16.6	8.5674	9.1549	2.43	
	14 23 14.2		228	8 51 10.31	51 29.91	18 13 6.4	11 50.3	8.5665	9.1559	2.45	
	15 23 11.2		229	8 52 3.31	52 22.90	18 9 40.0	8 23.6	8.5655	9.1569	2.46	
	16 23 8.1		230	8 52 56.19	53 15.77	18 6 13.1	4 56.4	8.5645	9.1578	2.48	
	17 23 5.1		231	8 53 48.95	54 8.51	18 2 45.8	1 28.8	8.5634	9.1587	2.49	
	18 23 2.0		232	8 54 41.58	55 1.12	17 59 18.0	58 0.7	8.5623	9.1595	2.51	
	19 22 59.0		233	8 55 34.07	55 53.59	17 55 49.9	54 32.3	8.5611	9.1603	2.52	
	20 22 55.9		234	8 56 26.42	56 45.92	17 52 21.4	51 3.6	8.5599	9.1610	2.54	
	21 22 52.9		235	8 57 18.63	57 38.10	17 48 52.6	47 34.5	8.5586	9.1616	2.55	
	22 22 49.8		236	8 58 10.69	58 30.13	17 45 23.5	44 5.2	8.5573	9.1621	2.57	
	23 22 46.8		237	8 59 2.59	59 22.00	17 41 54.2	40 35.7	8.5560	9.1626	2.58	
	24 22 43.7		238	8 59 54.33	0 13.71	17 38 24.7	37 6.0	8.5547	9.1630	2.60	
	25 22 40.6		239	9 0 45.90	1 5.25	17 34 55.0	33 36.1	8.5533	9.1633	2.61	
	26 22 37.5		240	9 1 37.31	1 56.62	17 31 25.2	30 6.1	8.5519	9.1636	2.62	
	27 22 34.4		241	9 2 28.54	2 47.81	17 27 55.2	26 35.9	8.5504	9.1638	2.63	
	28 22 31.4		242	9 3 19.60	3 38.83	17 24 25.1	23 6.7	8.5489	9.1640	2.64	
	29 22 28.3		243	9 4 10.47	4 29.66	17 20 55.0	19 35.4	8.5473	9.1641	2.65	
	30 22 25.2		244	9 5 1.16	5 20.31	17 17 24.8	16 5.1	8.5457	9.1641	2.66	
	31 22 22.1		245	9 5 51.66	6 10.77	+17 13 54.6	12 34.8	+8.5441	-9.1641	-2.67	



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
		h. m. s.	m. s.	° ' "	° ' "				
Sept. 1 22 19.0	246	9 6 41.96	7 1.02	+17 10 24.4	9 4.5	+8.5424	-9.1641	-2.68	
2 22 15.9	247	9 7 32.07	7 51.08	17 6 54.3	5 34.3	8.5407	9.1640	2.69	
3 22 12.8	248	9 8 21.98	8 40.94	17 3 24.2	2 4.1	8.5389	9.1638	2.70	
4 22 9.7	249	9 9 11.68	9 30.59	16 59 54.2	58 34.0	8.5371	9.1636	2.71	
5 22 6.6	250	9 10 1.17	10 20.02	16 56 24.4	55 4.1	8.5352	9.1633	2.72	
6 22 3.5	251	9 10 50.44	11 9.23	16 52 54.7	51 34.4	8.5333	9.1629	2.73	
7 22 0.4	252	9 11 39.49	11 58.22	16 49 25.3	48 5.0	8.5313	9.1624	2.74	
8 21 57.3	253	9 12 28.31	12 46.98	16 45 56.2	44 35.9	8.5292	9.1618	2.75	
9 21 54.2	254	9 13 16.90	13 35.50	16 42 27.3	41 7.0	8.5271	9.1612	2.76	
10 21 51.1	255	9 14 5.24	14 23.78	16 38 58.7	37 38.5	8.5249	9.1605	2.77	
11 21 47.9	256	9 14 53.34	15 11.81	16 35 30.5	34 10.3	8.5226	9.1597	2.78	
12 21 44.7	257	9 15 41.19	15 59.59	16 32 2.7	30 42.6	8.5203	9.1588	2.79	
13 21 41.6	258	9 16 28.78	16 47.12	16 28 35.4	27 15.4	8.5180	9.1578	2.80	
14 21 38.5	259	9 17 16.12	17 34.38	16 25 8.6	23 48.7	8.5156	9.1567	2.81	
15 21 35.4	260	9 18 3.19	18 21.37	16 21 42.4	20 22.6	8.5131	9.1554	2.82	
16 21 32.2	261	9 18 49.99	19 8.09	16 18 16.8	16 57.1	8.5106	9.1541	2.83	
17 21 29.0	262	9 19 36.51	19 54.53	16 14 51.8	13 32.3	8.5080	9.1527	2.84	
18 21 25.8	263	9 20 22.75	20 40.68	16 11 27.5	10 8.1	8.5053	9.1512	2.85	
19 21 22.6	264	9 21 8.69	21 26.54	16 8 3.9	6 44.7	8.5025	9.1496	2.86	
20 21 19.4	265	9 21 54.34	22 2.10	16 4 41.1	3 22.1	8.4996	9.1479	2.87	
21 21 16.2	266	9 22 39.68	22 57.36	16 1 19.1	0 0.3	8.4967	9.1461	2.88	
22 21 13.0	267	9 23 24.72	23 42.30	15 57 57.9	56 39.3	8.4937	9.1443	2.88	+3.32
23 21 9.8	268	9 24 9.44	24 26.92	15 54 37.5	53 19.2	8.4906	9.1424	2.89	3.34
24 21 6.6	269	9 24 53.84	25 11.22	15 51 18.1	50 0.1	8.4875	9.1404	2.89	3.36
25 21 3.4	270	9 25 37.93	25 55.20	15 47 59.6	46 41.9	8.4843	9.1383	2.90	3.38
26 21 0.2	271	9 26 21.70	26 38.86	15 44 42.1	43 24.7	8.4811	9.1361	2.90	3.40
27 20 57.0	272	9 27 5.14	27 22.19	15 41 25.6	40 8.5	8.4778	9.1338	2.91	3.41
28 20 53.8	273	9 27 48.25	28 5.19	15 38 10.2	36 53.4	8.4745	9.1313	2.92	3.43
29 20 50.6	274	9 28 31.02	28 47.84	15 34 55.9	33 39.5	8.4711	9.1287	2.93	3.44
30 20 47.4	275	9 29 13.44	29 30.14	15 31 42.8	30 26.8	8.4675	9.1261	2.93	3.45
Oct. 1 20 44.2	276	9 29 55.50	30 12.08	15 28 30.9	27 15.3	8.4638	9.1234	2.94	3.47
2 20 41.0	277	9 30 37.21	30 53.66	15 25 20.2	24 5.0	8.4600	9.1206	2.94	3.48
3 20 37.8	278	9 31 18.56	31 34.88	15 22 10.7	20 56.0	8.4561	9.1176	2.95	3.50
4 20 34.5	279	9 31 59.53	32 15.72	15 19 2.6	17 48.3	8.4522	9.1144	2.95	3.51
5 20 31.2	280	9 32 40.13	32 56.18	15 15 55.8	14 42.0	8.4481	9.1111	2.96	3.53
6 20 27.9	281	9 33 20.35	33 36.26	15 12 50.5	11 37.2	8.4440	9.1077	2.97	3.54
7 20 24.7	282	9 34 0.19	34 15.96	15 9 46.7	8 33.9	8.4397	9.1042	2.97	3.56
8 20 21.4	283	9 34 39.63	34 55.26	15 6 44.4	5 32.1	8.4354	9.1006	2.98	3.57
9 20 18.1	284	9 35 18.67	35 34.75	15 3 43.6	2 31.9	8.4309	9.0968	2.99	3.58
10 20 14.8	285	9 35 57.31	36 12.64	15 0 44.5	59 33.4	8.4263	9.0928	2.99	3.59
11 20 11.5	286	9 36 35.53	36 50.71	14 57 47.1	56 36.6	8.4215	9.0887	3.00	3.61
12 20 8.2	287	9 37 13.33	37 28.36	14 54 51.3	53 41.4	8.4166	9.0844	3.01	3.62
13 20 4.9	288	9 37 50.70	38 5.57	14 51 57.3	50 48.0	8.4116	9.0799	3.02	3.64
14 20 1.6	289	9 38 27.04	38 42.35	14 49 5.1	47 56.5	8.4065	9.0752	3.03	3.65
15 19 58.3	290	9 39 4.14	39 18.69	14 46 14.8	45 6.9	8.4012	9.0703	3.04	3.67
16 19 55.0	291	9 39 40.18	39 54.57	14 43 26.4	42 19.2	8.3957	9.0652	3.04	3.68
17 19 51.7	292	9 40 15.77	40 29.98	14 40 40.0	39 33.5	8.3901	9.0600	3.05	3.69
18 19 48.4	293	9 40 50.89	41 4.93	14 37 55.7	36 49.9	8.3844	9.0546	3.06	3.70
19 19 45.0	294	9 41 25.55	41 39.41	14 35 13.4	34 8.4	8.3785	9.0490	3.06	3.71
20 19 41.6	295	9 41 59.73	42 13.41	14 32 33.3	31 29.1	8.3724	9.0432	3.06	3.72
21 19 38.2	296	9 42 33.43	42 46.93	14 29 55.3	28 51.9	8.3662	9.0372	3.07	3.73
22 19 34.8	297	9 43 6.65	43 19.97	14 27 19.6	26 17.0	8.3598	9.0309	3.07	3.73
23 19 31.4	298	9 43 39.38	43 52.51	14 24 46.2	23 44.4	8.3533	9.0244	3.08	3.74
24 19 28.0	299	9 44 11.61	44 24.55	14 22 15.0	21 14.2	8.3466	9.0177	3.08	3.75
25 19 24.6	300	9 44 43.34	44 56.09	14 19 46.2	18 46.3	8.3398	9.0108	3.09	3.76
26 19 21.2	301	9 45 14.57	45 27.13	14 17 19.7	16 20.8	8.3327	9.0037	3.10	3.76
27 19 17.8	302	9 45 45.29	45 57.65	14 14 55.6	13 57.7	8.3254	8.9964	3.11	3.77
28 19 14.4	303	9 46 15.49	46 27.55	14 12 34.0	11 37.1	8.3179	8.9889	3.11	3.78
29 19 10.9	304	9 46 45.16	46 57.11	14 10 14.9	9 19.0	8.3101	8.9811	3.12	3.79
30 19 7.4	305	9 47 14.30	47 26.04	14 7 58.3	7 3.4	8.3021	8.9729	3.12	3.80
31 19 3.9	306	9 47 42.90	47 54.43	14 5 44.4	4 50.5	8.2939	8.9643	3.13	3.81
32 19 0.4	307	9 48 10.95	48 22.26	+14 3 33.1	2 40.2	+8.2854	-8.9553	-3.13	+3.82



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
Nov. d. h. m.		h. m. s.	m. s.	° ' "	° ' "				
1 19 0.4	307	9 48 10.95	48 22.26	+14 3 33.1	2 40.2	+8.2854	-8.9553	-3.13	+3.82
2 18 56.9	308	9 48 38.45	48 49.54	14 1 24.6	0 32.8	8.2767	8.9460	3.14	3.83
3 18 53.4	309	9 49 5.40	49 16.27	13 59 18.8	58 28.1	8.2676	8.9363	3.14	3.83
4 18 49.9	310	9 49 31.78	49 42.42	13 57 15.8	56 26.2	8.2583	8.9263	3.15	3.84
5 18 46.4	311	9 49 57.58	50 7.99	13 55 15.7	54 27.3	8.2485	8.9159	3.15	3.85
6 18 42.9	312	9 50 22.81	50 32.98	13 53 18.5	52 31.3	8.2385	8.9051	3.16	3.86
7 18 39.3	313	9 50 47.45	50 57.38	13 51 24.2	50 38.2	8.2280	8.8938	3.16	3.86
8 18 35.8	314	9 51 11.50	51 21.18	13 49 33.0	48 48.2	8.2172	8.8820	3.17	3.87
9 18 32.3	315	9 51 34.94	51 44.38	13 47 44.8	47 1.3	8.2060	8.8696	3.17	3.88
10 18 28.8	316	9 51 57.77	52 6.97	13 45 59.8	45 17.6	8.1943	8.8565	3.18	3.89
11 18 25.2	317	9 52 19.99	52 28.94	13 44 17.9	43 37.0	8.1822	8.8427	3.18	3.89
12 18 21.6	318	9 52 41.58	52 50.28	13 42 39.3	41 59.7	8.1696	8.8282	3.19	3.90
13 18 18.0	319	9 53 2.54	53 10.99	13 41 4.0	40 25.7	8.1564	8.8131	3.19	3.90
14 18 14.4	320	9 53 22.87	53 31.06	13 39 32.0	38 55.1	8.1427	8.7972	3.20	3.91
15 18 10.8	321	9 53 42.55	53 50.48	13 38 3.4	37 27.9	8.1285	8.7806	3.20	3.91
16 18 7.2	322	9 54 1.59	54 9.25	13 36 38.1	36 4.0	8.1137	8.7632	3.21	3.91
17 18 3.6	323	9 54 19.97	54 27.37	13 35 16.3	34 43.6	8.0982	8.7450	3.21	3.92
18 18 0.0	324	9 54 37.70	54 44.88	13 33 58.0	33 26.7	8.0820	8.7258	3.22	3.92
19 17 56.4	325	9 54 54.76	55 1.62	13 32 43.1	32 13.9	8.0651	8.7056	3.22	3.92
20 17 52.7	326	9 55 11.16	55 17.74	13 31 31.7	31 3.2	8.0474	8.6842	3.22	3.93
21 17 49.0	327	9 55 26.88	55 33.19	13 30 23.9	29 56.9	8.0287	8.6616	3.22	3.93
22 17 45.3	328	9 55 41.93	55 47.96	13 29 19.6	28 54.1	8.0090	8.6375	3.23	3.94
23 17 41.6	329	9 55 56.29	56 2.04	13 28 18.9	27 54.9	7.9883	8.6118	3.23	3.94
24 17 37.9	330	9 56 9.96	56 15.43	13 27 21.8	26 59.3	7.9664	8.5841	3.23	3.94
25 17 34.2	331	9 56 22.94	56 28.12	13 26 28.4	26 7.4	7.9431	8.5542	3.23	3.95
26 17 30.5	332	9 56 35.23	56 40.13	13 25 38.7	25 19.2	7.9184	8.5216	3.24	3.95
27 17 26.8	333	9 56 46.81	56 51.42	13 24 52.7	24 34.8	7.8920	8.4861	3.24	3.96
28 17 23.0	334	9 56 57.69	57 2.01	13 24 10.5	23 54.2	7.8638	8.4464	3.24	3.96
29 17 19.2	335	9 57 7.86	57 11.88	13 23 32.1	23 17.4	7.8336	8.4027	3.24	3.96
30 17 15.4	336	9 57 17.32	57 21.05	13 22 57.6	22 44.5	7.8008	8.3542	3.25	3.97
Dec. 1 17 11.6	337	9 57 26.06	57 29.49	13 22 27.0	22 15.5	7.7651	8.2995	3.25	3.97
2 17 7.8	338	9 57 34.09	57 37.21	13 22 0.3	21 50.4	7.7257	8.2361	3.25	3.97
3 17 4.0	339	9 57 41.37	57 44.20	13 21 37.4	21 29.1	7.6818	8.1618	3.25	3.97
4 17 0.2	340	9 57 47.92	57 50.45	13 21 18.5	21 11.8	7.6330	8.0708	3.25	3.98
5 16 56.4	341	9 57 53.74	57 55.96	13 21 3.5	20 58.5	7.5780	7.9556	3.25	3.98
6 16 52.5	342	9 57 58.82	58 0.74	13 20 52.5	20 49.1	7.5146	7.7959	3.25	3.98
7 16 48.6	343	9 58 3.15	58 4.76	13 20 45.5	20 43.8	7.4399	7.5406	3.25	3.98
8 16 44.7	344	9 58 6.73	58 8.08	13 20 42.5	20 42.5	7.3489	-6.8194	3.26	3.98
9 16 40.8	345	9 58 9.57	58 10.55	13 20 43.6	20 45.3	7.2334	+7.3330	3.26	3.99
10 16 36.9	346	9 58 11.66	58 12.33	13 20 48.7	20 52.1	7.0747	7.6959	3.26	3.99
11 16 33.0	347	9 58 13.00	58 13.35	13 20 57.9	21 2.9	6.8216	7.8908	3.26	3.99
12 16 29.1	348	9 58 13.57	58 13.60	13 21 11.1	21 17.8	+6.1372	8.0249	3.26	3.99
13 16 25.1	349	9 58 13.38	58 13.09	13 21 28.4	21 36.8	-6.5898	8.1272	3.26	3.99
14 16 21.1	350	9 58 12.43	58 11.82	13 21 49.7	21 59.8	6.9614	8.3099	3.26	3.99
15 16 17.1	351	9 58 10.73	58 9.80	13 22 15.1	22 26.9	7.1586	8.3794	3.26	3.99
16 16 13.1	352	9 58 8.27	58 7.02	13 22 44.5	22 58.0	7.2938	8.3393	3.26	3.98
17 16 9.1	353	9 58 5.06	58 3.49	13 23 18.0	23 33.1	7.3966	8.3912	3.26	3.98
18 16 5.1	354	9 58 1.09	57 59.21	13 23 55.5	24 12.9	7.4794	8.4371	3.26	3.98
19 16 1.1	355	9 57 56.37	57 54.18	13 24 36.9	24 55.3	7.5486	8.4786	3.26	3.98
20 15 57.1	356	9 57 50.90	57 48.40	13 25 22.3	25 42.3	7.6085	8.5160	3.26	3.97
21 15 53.1	357	9 57 44.68	57 41.87	13 26 11.5	26 33.2	7.6608	8.5504	3.26	3.97
22 15 49.1	358	9 57 37.71	57 34.60	13 27 4.6	27 27.9	7.7065	8.5820	3.26	3.97
23 15 45.0	359	9 57 30.01	57 26.59	13 28 1.6	28 26.5	7.7482	8.6114	3.25	3.97
24 15 40.9	360	9 57 21.57	57 17.85	13 29 2.4	29 28.9	7.7862	8.6389	3.25	3.96
25 15 36.8	361	9 57 12.40	57 8.38	13 30 7.1	30 35.1	7.8210	8.6645	3.25	3.96
26 15 32.7	362	9 57 2.50	56 58.18	13 31 15.5	31 45.0	7.8530	8.6885	3.25	3.96
27 15 28.6	363	9 56 51.87	56 47.26	13 32 27.7	32 58.7	7.8826	8.7111	3.24	3.95
28 15 24.5	364	9 56 40.53	56 35.63	13 33 43.6	34 16.1	7.9100	8.7323	3.24	3.95
29 15 20.4	365	9 56 28.47	56 23.27	13 35 3.2	35 37.2	7.9355	8.7522	3.23	3.94
30 15 16.3	366	9 56 15.71	56 10.22	13 36 26.4	37 1.9	7.9593	8.7708	3.23	3.93
31 15 12.2	367	9 56 2.25	55 56.48	13 37 53.1	38 30.0	7.9817	8.7883	3.22	3.92
32 15 8.0	368	9 55 48.10	55 42.05	+13 39 23.3	40 1.6	-8.0027	+8.8050	-3.22	+3.91



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
Jan. d. h. m.		h. m. s.	m. s.	° ' "	' "				
0 15 12.0	0	9 52 58.55	52 54.46	+14 14 27.0	14 53.7	-7.8349	+ 8.650	-2.96	+3.67
1 15 7.9	1	9 52 48.52	52 44.28	14 15 32.2	15 59.6	7.8509	8.662	2.95	3.66
2 15 3.8	2	9 52 38.12	52 33.74	14 16 39.2	17 7.3	7.8661	8.673	2.94	3.64
3 14 59.7	3	9 52 27.36	52 22.83	14 17 47.9	18 16.7	7.8807	8.684	2.93	3.63
4 14 55.6	4	9 52 16.24	52 11.56	14 18 58.3	19 27.8	7.8945	8.694	2.92	3.62
5 14 51.4	5	9 52 4.77	51 59.95	14 20 10.4	20 40.5	7.9076	8.704	2.91	3.61
6 14 47.3	6	9 51 52.96	51 48.00	14 21 24.1	21 54.9	7.9201	8.714	2.91	3.60
7 14 43.2	7	9 51 40.81	51 35.71	14 22 39.4	23 10.8	7.9323	8.723	2.90	3.59
8 14 39.0	8	9 51 28.32	51 23.08	14 23 56.3	24 28.3	7.9441	8.732	2.89	3.58
9 14 34.9	9	9 51 15.49	51 10.12	14 25 14.7	25 47.3	7.9553	8.740	2.88	3.57
10 14 30.7	10	9 51 2.34	50 56.85	14 26 34.7	27 7.9	7.9657	8.749	2.87	3.56
11 14 26.6	11	9 50 48.88	50 43.27	14 27 56.2	28 30.0	7.9755	8.756	2.87	3.55
12 14 22.4	12	9 50 35.12	50 29.39	14 29 19.0	29 53.4	7.9851	8.763	2.86	3.54
13 14 18.3	13	9 50 21.05	50 15.20	14 30 43.2	31 18.1	7.9945	8.770	2.85	3.52
14 14 14.1	14	9 50 6.68	50 0.71	14 32 8.7	32 44.1	8.0035	8.777	2.84	3.50
15 14 9.9	15	9 49 52.02	49 45.94	14 33 35.5	34 11.4	8.0118	8.783	2.83	3.48
16 14 5.8	16	9 49 37.09	49 30.90	14 35 3.5	35 39.9	8.0198	8.789	2.82	3.46
17 14 1.6	17	9 49 21.88	49 15.59	14 36 32.7	37 9.6	8.0275	8.795	2.81	3.44
18 13 57.4	18	9 49 6.41	49 0.02	14 38 3.1	38 40.4	8.0346	8.800	2.80	3.42
19 13 53.2	19	9 48 50.69	48 44.20	14 39 34.6	40 12.3	8.0414	8.805	2.78	3.40
20 13 49.0	20	9 48 34.73	48 28.14	14 41 7.1	41 45.2	8.0478	8.810	2.76	3.38
21 13 44.8	21	9 48 18.54	48 11.85	14 42 40.6	43 19.1	8.0541	8.815	2.74	3.35
22 13 40.6	22	9 48 2.11	47 55.34	14 44 15.0	44 53.8	8.0602	8.819	2.72	3.32
23 13 36.4	23	9 47 45.46	47 38.61	14 45 50.3	46 29.4	8.0659	8.823	2.70	3.29
24 13 32.2	24	9 47 28.59	47 21.66	14 47 26.4	48 5.8	8.0713	8.826	2.68	3.26
25 13 27.9	25	9 47 11.52	47 4.51	14 49 3.2	49 42.9	8.0763	8.829	2.66	3.23
26 13 23.7	26	9 46 54.26	46 47.18	14 50 40.7	51 20.6	8.0808	8.832	2.63	3.19
27 13 19.5	27	9 46 36.83	46 29.68	14 52 18.8	52 58.9	8.0851	8.835	2.60	3.15
28 13 15.3	28	9 46 19.23	46 12.02	14 53 57.5	54 37.8	8.0891	8.837	2.57	3.10
29 13 11.0	29	9 46 1.47	45 54.31	14 55 36.8	56 17.3	8.0928	8.840	2.53	3.04
30 13 6.8	30	9 45 43.57	45 36.26	14 57 16.6	57 57.3	8.0961	8.842	2.49	2.98
31 13 2.6	31	9 45 25.54	45 18.17	14 58 56.8	59 37.6	8.0992	8.843	2.45	2.91
Feb. 1 12 58.4	32	9 45 7.38	44 59.96	15 0 37.3	1 18.2	8.1022	8.844	2.41	2.84
2 12 54.1	33	9 44 49.10	44 41.64	15 2 18.0	2 59.0	8.1049	8.845	2.37	2.76
3 12 49.9	34	9 44 30.71	44 23.31	15 3 59.0	4 40.1	8.1074	8.846	2.33	+2.68
4 12 45.6	35	9 44 12.22	44 4.69	15 5 40.2	6 21.3	8.1095	8.847	2.28	
5 12 41.4	36	9 43 53.65	43 46.09	15 7 21.5	8 2.6	8.1114	8.847	2.23	
6 12 37.2	37	9 43 35.00	43 27.42	15 9 2.9	9 44.0	8.1130	8.848	2.17	
7 12 32.9	38	9 43 16.29	43 8.69	15 10 44.3	11 25.4	8.1144	8.848	2.09	
8 12 28.7	39	9 42 57.52	42 49.90	15 12 25.7	13 6.7	8.1157	8.848	1.99	
9 12 24.4	40	9 42 38.70	42 31.07	15 14 7.1	14 48.0	8.1166	8.847	1.86	
10 12 20.2	41	9 42 19.85	42 12.21	15 15 48.4	16 29.2	8.1172	8.847	-1.68	-2.68
11 12 15.9	42	9 42 0.98	41 53.34	15 17 29.4	18 10.1	8.1176	8.845		2.76
12 12 11.7	43	9 41 42.09	41 34.45	15 19 10.1	19 50.7	8.1180	8.844		2.84
13 12 7.5	44	9 41 23.19	41 15.56	15 20 50.5	21 30.9	8.1180	8.843		2.91
14 12 3.2	45	9 41 4.30	40 56.68	15 22 30.6	23 10.8	8.1176	8.841	+1.68	2.98
15 11 59.0	46	9 40 45.43	40 37.82	15 24 10.3	24 50.3	8.1172	8.839	1.87	3.04
16 11 54.7	47	9 40 26.58	40 18.99	15 25 49.5	26 29.3	8.1165	8.837	2.01	3.09
17 11 50.5	48	9 40 7.77	40 0.21	15 27 28.1	28 7.7	8.1155	8.834	2.12	3.14
18 11 46.3	49	9 39 49.01	39 41.48	15 29 6.2	29 45.5	8.1142	8.832	2.21	3.19
19 11 42.0	50	9 39 30.31	39 22.82	15 30 43.7	31 22.7	8.1126	8.829	2.28	3.23
20 11 37.8	51	9 39 11.69	39 4.24	15 32 20.6	32 59.3	8.1106	8.826	2.33	3.26
21 11 33.5	52	9 38 53.16	38 45.74	15 33 56.7	34 35.1	8.1085	8.823	2.37	3.28
22 11 29.3	53	9 38 34.72	38 27.34	15 35 32.0	36 10.0	8.1061	8.819	2.41	3.30
23 11 25.0	54	9 38 16.39	38 9.05	15 37 6.4	37 44.1	8.1035	8.815	2.45	3.32
24 11 20.8	55	9 37 58.17	37 50.89	15 38 40.0	39 17.3	8.1006	8.811	2.49	3.33
25 11 16.6	56	9 37 40.08	37 32.86	15 40 12.7	40 49.6	8.0974	8.806	2.52	3.35
26 11 12.3	57	9 37 22.13	37 14.97	15 41 44.4	42 20.9	8.0939	8.801	2.55	3.37
27 11 8.1	58	9 37 4.33	36 57.24	15 43 15.0	43 51.1	8.0902	8.796	2.58	3.38
28 11 3.9	59	9 36 46.68	36 39.67	15 44 44.4	45 20.1	8.0863	8.790	2.61	3.40
29 10 59.7	60	9 36 29.20	36 22.26	15 46 12.7	46 47.9	8.0819	8.785	2.64	3.42
30 10 55.4	61	9 36 11.90	36 5.03	+15 47 39.9	48 14.5	-8.0774	+ 8.779	+2.66	-3.44



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.		h. m. s.	m. s.	° ' "	° ' "				
Mar. 1 10 55.4	61	9 36 11.90	36 5.03	+15 47 39.9	48 14.5	-8.0774	+ 8.779	+2.66	-3.44
2 10 51.2	62	9 35 54.78	35 47.99	15 49 5.9	49 40.0	8.0726	8.773	2.68	3.45
3 10 47.0	63	9 35 37.86	35 31.15	15 50 30.7	51 4.3	8.0673	8.766	2.69	3.47
4 10 42.8	64	9 35 21.15	35 14.52	15 51 54.2	52 27.3	8.0619	8.760	2.71	3.48
5 10 38.6	65	9 35 4.65	34 58.11	15 53 16.3	53 48.9	8.0562	8.753	2.72	3.49
6 10 34.4	66	9 34 48.37	34 41.93	15 54 37.1	55 9.1	8.0501	8.745	2.74	3.51
7 10 30.2	67	9 34 32.33	34 25.99	15 55 56.5	56 27.9	8.0436	8.737	2.75	3.52
8 10 26.0	68	9 34 16.53	34 10.29	15 57 14.4	57 45.2	8.0370	8.729	2.77	3.53
9 10 21.8	69	9 34 0.97	33 54.83	15 58 30.9	59 1.1	8.0301	8.721	2.78	3.54
10 10 17.6	70	9 33 45.66	33 39.63	15 59 45.9	60 15.5	8.0231	8.712	2.80	3.56
11 10 13.4	71	9 33 30.60	33 24.68	16 0 59.4	1 28.4	8.0156	8.703	2.81	3.57
12 10 9.2	72	9 33 15.81	33 10.00	16 2 11.3	2 39.7	8.0073	8.694	2.83	3.58
13 10 5.0	73	9 33 1.31	32 55.61	16 3 21.6	3 49.3	7.9986	8.684	2.84	3.59
14 10 0.8	74	9 32 47.10	32 41.51	16 4 30.3	4 57.3	7.9898	8.674	2.85	3.60
15 9 56.7	75	9 32 33.18	32 27.71	16 5 37.4	6 3.7	7.9806	8.663	2.86	3.61
16 9 52.5	76	9 32 19.56	32 14.22	16 6 42.9	7 8.5	7.9708	8.652	2.87	3.62
17 9 48.4	77	9 32 6.25	32 1.04	16 7 46.6	8 11.5	7.9607	8.640	2.88	3.63
18 9 44.3	78	9 31 53.25	31 48.17	16 8 48.6	9 12.8	7.9502	8.628	2.89	3.63
19 9 40.1	79	9 31 40.57	31 35.62	16 9 48.8	10 12.3	7.9392	8.615	2.90	3.64
20 9 36.0	80	9 31 28.21	31 23.40	16 10 47.3	11 10.0	7.9276	8.602	2.91	3.64
21 9 31.9	81	9 31 16.19	31 11.52	16 11 43.9	12 5.9	7.9154	8.587	2.92	3.65
22 9 27.7	82	9 31 4.51	30 59.98	16 12 38.6	12 59.9	7.9025	8.572	2.93	3.65
23 9 23.6	83	9 30 53.18	30 48.79	16 13 31.5	13 52.0	7.8891	8.558	2.94	3.65
24 9 19.5	84	9 30 42.20	30 37.95	16 14 22.6	14 42.3	7.8750	8.542	2.95	3.66
25 9 15.4	85	9 30 31.58	30 27.48	16 15 11.8	15 30.7	7.8601	8.525	2.95	3.66
26 9 11.3	86	9 30 21.33	30 17.38	16 15 59.0	16 17.2	7.8445	8.507	2.95	3.66
27 9 7.2	87	9 30 11.45	30 7.65	16 16 44.3	17 1.7	7.8282	8.488	2.96	3.67
28 9 3.1	88	9 30 1.94	29 58.29	16 17 27.6	17 44.2	7.8111	8.468	2.96	3.67
29 8 59.0	89	9 29 52.81	29 49.31	16 18 9.0	18 24.8	7.7930	8.448	2.96	3.67
30 8 55.0	90	9 29 44.06	29 40.72	16 18 48.4	19 3.4	7.7739	8.426	2.97	3.68
31 8 50.9	91	9 29 35.70	29 32.51	16 19 25.8	19 40.0	7.7535	8.403	2.97	3.68
Apr. 1 8 46.8	92	9 29 27.73	29 24.68	16 20 1.2	20 14.6	7.7326	8.378	2.97	3.68
2 8 42.8	93	9 29 20.14	29 17.24	16 20 34.6	20 47.2	7.7106	8.353	2.98	3.68
3 8 38.7	94	9 29 12.94	29 10.20	16 21 6.1	21 17.9	7.6867	8.326	2.98	3.68
4 8 34.7	95	9 29 6.14	29 3.56	16 21 35.6	21 46.6	7.6609	8.296	2.99	3.68
5 8 30.7	96	9 28 59.75	28 57.33	16 22 3.0	22 13.2	7.6333	8.263	2.99	3.68
6 8 26.7	97	9 28 53.76	28 51.50	16 22 28.4	22 37.8	7.6043	8.229	2.99	3.68
7 8 22.6	98	9 28 48.17	28 46.07	16 22 51.8	23 0.4	7.5732	8.192	2.99	3.69
8 8 18.6	99	9 28 42.98	28 41.04	16 23 13.2	23 21.0	7.5393	8.151	3.00	3.69
9 8 14.6	100	9 28 38.20	28 36.42	16 23 32.6	23 39.6	7.5020	8.105	3.00	3.69
10 8 10.6	101	9 28 33.83	28 32.21	16 23 49.9	23 56.1	7.4613	8.052	3.00	3.69
11 8 6.6	102	9 28 29.87	28 28.42	16 24 5.1	24 10.5	7.4157	7.994	3.00	3.69
12 8 2.6	103	9 28 26.33	28 25.04	16 24 18.3	24 22.9	7.3641	7.928	3.01	3.69
13 7 58.6	104	9 28 23.21	28 22.08	16 24 29.5	24 33.3	7.3063	7.848	3.01	3.69
14 7 54.6	105	9 28 20.50	28 19.54	16 24 38.6	24 41.6	7.2396	7.747	3.01	3.69
15 7 50.7	106	9 28 18.21	28 17.42	16 24 45.6	24 47.8	7.1597	7.620	3.01	3.69
16 7 46.7	107	9 28 16.34	28 15.72	16 24 50.6	24 52.0	7.0609	7.438	3.01	3.69
17 7 42.7	108	9 28 14.90	28 14.44	16 24 53.5	24 54.1	6.9315	+ 7.109	3.02	3.69
18 7 38.8	109	9 28 13.88	28 13.59	16 24 54.3	24 54.1	6.7501	- 6.143	3.02	3.69
19 7 34.9	110	9 28 13.28	28 13.16	16 24 53.1	24 52.0	-6.4271	7.194	3.02	3.69
20 7 30.9	111	9 28 13.11	28 13.16	16 24 49.8	24 47.8	+5.4437	7.480	3.02	3.69
21 7 27.0	112	9 28 13.36	28 13.58	16 24 44.4	24 41.6	6.5091	7.651	3.02	3.69
22 7 23.1	113	9 28 14.04	28 14.43	16 24 36.9	24 33.3	6.7910	7.771	3.01	3.69
23 7 19.2	114	9 28 15.14	28 15.70	16 24 27.4	24 23.0	6.9606	7.863	3.01	3.69
24 7 15.3	115	9 28 16.67	28 17.39	16 24 15.9	24 10.7	7.0822	7.940	3.01	3.69
25 7 11.4	116	9 28 18.62	28 19.51	16 24 2.3	23 56.3	7.1761	8.006	3.01	3.69
26 7 7.5	117	9 28 20.99	28 22.05	16 23 46.7	23 39.9	7.2533	8.063	3.01	3.69
27 7 3.6	118	9 28 23.78	28 25.01	16 23 29.0	23 21.4	7.3188	8.113	3.01	3.68
28 6 59.7	119	9 28 26.99	28 28.38	16 23 9.3	23 0.9	7.3757	8.158	3.01	3.68
29 6 55.9	120	9 28 30.62	28 32.17	16 22 47.6	22 38.4	7.4254	8.198	3.01	3.68
30 6 52.0	121	9 28 34.66	28 36.38	16 22 23.9	22 13.9	7.4700	8.234	3.01	3.68
31 6 48.2	122	9 28 39.12	28 41.00	+16 21 58.2	21 47.4	+7.5105	- 8.267	+3.01	-3.68



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit	In R.A.	In Dec.	In R.A.	In Dec.
May	d.	h. m.		h. m. s.	m. s.	° ' "	' "				
	1	6 48.2	122	9 28 39.12	28 41.00	+16 21 58.2	21 47.4	+7.5105	- 8.267	+3.01	-3.68
	2	6 44.4	123	9 28 43.99	28 46.03	16 21 30.6	21 19.0	7.5471	8.298	3.00	3.68
	3	6 40.5	124	9 28 49.27	28 51.47	16 21 1.0	20 48.6	7.5808	8.327	3.00	3.68
	4	6 36.7	125	9 28 54.96	28 57.32	16 20 29.4	20 16.2	7.6121	8.355	3.00	3.68
	5	6 32.9	126	9 29 1.06	29 3.58	16 19 55.8	19 41.9	7.6410	8.380	3.00	3.68
	6	6 29.1	127	9 29 7.56	29 10.24	16 19 20.3	19 5.7	7.6681	8.403	3.00	3.68
	7	6 25.2	128	9 29 14.47	29 17.31	16 18 42.9	18 27.5	7.6935	8.425	2.99	3.67
	8	6 21.4	129	9 29 21.78	29 24.78	16 18 3.6	17 47.4	7.7170	8.446	2.99	3.67
	9	6 17.6	130	9 29 29.48	29 32.64	16 17 22.4	17 5.4	7.7393	8.466	2.99	3.67
	10	6 13.8	131	9 29 37.58	29 40.89	16 16 39.3	16 21.6	7.7605	8.486	2.99	3.67
	11	6 10.0	132	9 29 46.07	29 49.53	16 15 54.3	15 35.9	7.7804	8.504	2.98	3.67
	12	6 6.2	133	9 29 54.95	29 58.57	16 15 7.4	14 48.3	7.7995	8.522	2.98	3.66
	13	6 2.4	134	9 30 4.22	30 8.00	16 14 18.6	13 58.8	7.8180	8.538	2.98	3.66
	14	5 58.7	135	9 30 13.89	30 17.82	16 13 28.0	13 7.4	7.8355	8.554	2.97	3.66
	15	5 54.9	136	9 30 23.94	30 28.03	16 12 35.5	12 14.2	7.8519	8.570	2.97	3.66
	16	5 51.1	137	9 30 34.37	30 38.61	16 11 41.1	11 19.1	7.8678	8.584	2.97	3.65
	17	5 47.4	138	9 30 45.18	30 49.57	16 10 44.9	10 22.1	7.8828	8.598	2.96	3.65
	18	5 43.6	139	9 30 56.36	31 0.90	16 9 46.9	9 23.3	7.8974	8.612	2.96	3.65
	19	5 39.9	140	9 31 7.92	31 12.61	16 8 47.1	8 22.8	7.9117	8.625	2.95	3.64
	20	5 36.2	141	9 31 19.86	31 24.70	16 7 45.5	7 20.5	7.9253	8.638	2.95	3.64
	21	5 32.5	142	9 31 32.17	31 37.16	16 6 42.1	6 16.4	7.9382	8.650	2.95	3.64
	22	5 28.7	143	9 31 44.84	31 49.98	16 5 36.9	5 10.5	7.9505	8.662	2.94	3.63
	23	5 25.0	144	9 31 57.87	32 3.16	16 4 29.8	4 2.7	7.9625	8.674	2.94	3.63
	24	5 21.3	145	9 32 11.26	32 16.69	16 3 21.0	2 53.2	7.9742	8.685	2.93	3.62
	25	5 17.6	146	9 32 25.01	32 30.57	16 2 10.5	1 42.0	7.9853	8.695	2.93	3.62
	26	5 13.9	147	9 32 39.10	32 44.80	16 0 58.3	0 29.1	7.9959	8.705	2.93	3.61
	27	5 10.2	148	9 32 53.54	32 59.38	15 59 44.4	59 14.5	8.0063	8.715	2.92	3.61
	28	5 6.5	149	9 33 8.32	33 14.30	15 58 28.9	57 58.3	8.0163	8.724	2.92	3.60
	29	5 2.9	150	9 33 23.44	33 29.56	15 57 11.7	56 40.4	8.0260	8.734	2.91	3.60
	30	4 59.2	151	9 33 38.90	33 45.15	15 55 52.8	55 20.9	8.0353	8.743	2.91	3.59
	31	4 55.5	152	9 33 54.68	34 1.07	15 54 32.3	53 59.8	8.0443	8.752	2.90	3.59
June	1	4 51.9	153	9 34 10.79	34 17.31	15 53 10.2	52 37.0	8.0530	8.760	2.90	3.58
	2	4 48.2	154	9 34 27.22	34 33.87	15 51 46.5	51 12.6	8.0615	8.769	2.90	3.58
	3	4 44.6	155	9 34 43.97	34 50.75	15 50 21.2	49 46.6	8.0697	8.777	2.89	3.57
	4	4 40.9	156	9 35 1.03	35 7.94	15 48 54.3	48 19.1	8.0777	8.784	2.89	3.57
	5	4 37.3	157	9 35 18.41	35 25.45	15 47 25.9	46 50.0	8.0854	8.792	2.88	3.57
	6	4 33.7	158	9 35 36.09	35 43.26	15 45 56.0	45 19.5	8.0929	8.799	2.88	3.56
	7	4 30.0	159	9 35 54.08	36 1.37	15 44 24.5	43 47.4	8.1003	8.807	2.87	3.56
	8	4 26.4	160	9 36 12.37	36 19.78	15 42 51.5	42 13.8	8.1074	8.814	2.86	3.56
	9	4 22.8	161	9 36 30.96	36 38.49	15 41 17.0	40 38.7	8.1143	8.821	2.86	3.55
	10	4 19.2	162	9 36 49.84	36 57.49	15 39 41.0	39 2.1	8.1210	8.827	2.85	3.55
	11	4 15.5	163	9 37 9.01	37 16.78	15 38 3.6	37 24.1	8.1275	8.834	2.85	3.55
	12	4 11.9	164	9 37 28.47	37 36.36	15 36 24.7	35 44.6	8.1339	8.840	2.84	3.54
	13	4 8.3	165	9 37 48.21	37 56.22	15 34 44.3	34 3.6	8.1401	8.846	2.83	3.54
	14	4 4.7	166	9 38 8.23	38 16.35	15 33 2.5	32 21.2	8.1461	8.853	2.83	3.54
	15	4 1.1	167	9 38 28.53	38 36.76	15 31 19.2	30 37.3	8.1520	8.859	2.82	3.54
	16	3 57.5	168	9 38 49.10	38 57.44	15 29 34.5	28 52.0	8.1576	8.864	2.82	3.53
	17	3 53.9	169	9 39 9.93	39 18.38	15 27 48.5	27 5.4	8.1630	8.870	2.81	3.53
	18	3 50.3	170	9 39 31.02	39 39.58	15 26 1.1	25 17.4	8.1684	8.875	2.80	3.53
	19	3 46.7	171	9 39 52.37	40 1.04	15 24 12.3	23 28.1	8.1737	8.881	2.80	3.52
	20	3 43.2	172	9 40 13.98	40 22.76	15 22 22.1	21 37.4	8.1788	8.886	2.79	3.52
	21	3 39.6	173	9 40 35.84	40 44.72	15 20 30.7	19 45.4	8.1837	8.891	2.78	3.51
	22	3 36.1	174	9 40 57.94	41 6.92	15 18 38.0	17 52.2	8.1885	8.896	2.77	3.51
	23	3 32.5	175	9 41 20.29	41 29.37	15 16 44.0	15 6.7	8.1932	8.901	2.76	3.50
	24	3 29.0	176	9 41 42.88	41 52.06	15 14 48.7	14 1.9	8.1978	8.906	2.76	3.50
	25	3 25.5	177	9 42 5.70	42 14.98	15 12 52.2	12 4.8	8.2020	8.910	2.75	3.49
	26	3 21.9	178	9 42 28.74	42 38.12	15 10 54.5	10 6.6	8.2062	8.915	2.74	3.48
	27	3 18.4	179	9 42 52.00	43 1.48	15 8 55.6	8 7.2	8.2103	8.919	2.73	3.47
	28	3 14.9	180	9 43 15.48	43 25.05	15 6 55.5	6 6.6	8.2143	8.923	2.72	3.46
	29	3 11.4	181	9 43 39.17	43 48.83	15 4 54.2	4 4.8	8.2182	8.927	2.72	3.46
	30	3 7.8	182	9 44 3.07	44 12.82	15 2 51.8	2 1.9	8.2220	8.932	2.71	3.45
	31	3 4.3	183	9 44 27.18	44 37.02	+14 60 48.2	59 57.8	+8.2256	- 8.936	+2.70	-3.44



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
July	d.	h.	m.	h.	m.	s.	m.	s.			
1	3	4.3	183	9 44 27.18	44 37.02	+14 60 48.2	59 57.8	+8.2256	- 8.936	+2.70	-3.44
2	3	0.8	184	9 44 51.49	45 1.42	14 58 43.5	57 52.6	8.2293	8.939	2.69	3.43
3	2	57.3	185	9 45 16.01	45 26.03	14 56 37.7	55 46.3	8.2328	8.943	2.68	3.42
4	2	53.7	186	9 45 40.72	45 50.83	14 54 30.9	53 39.0	8.2362	8.947	2.68	3.42
5	2	50.2	187	9 46 5.62	46 15.81	14 52 23.0	51 30.6	8.2395	8.950	2.67	3.41
6	2	46.7	188	9 46 30.71	46 40.98	14 50 14.1	49 21.2	8.2427	8.954	2.66	3.40
7	2	43.2	189	9 46 55.98	47 6.33	14 48 4.1	47 10.7	8.2457	8.957	2.65	3.39
8	2	39.7	190	9 47 21.42	47 31.85	14 45 53.1	44 59.2	8.2487	8.961	2.64	3.38
9	2	36.2	191	9 47 47.04	47 57.55	14 43 41.0	42 46.7	8.2517	8.964	2.63	3.37
10	2	32.7	192	9 48 12.83	48 23.42	14 41 27.9	40 33.2	8.2545	8.967	2.62	3.36
11	2	29.2	193	9 48 38.79	48 49.45	14 39 13.9	38 18.8	8.2573	8.970	2.61	3.35
12	2	25.7	194	9 49 4.91	49 15.64	14 36 59.0	36 3.4	8.2600	8.973	2.60	3.34
13	2	22.2	195	9 49 31.19	49 41.99	14 34 43.1	33 47.1	8.2626	8.976	2.59	3.33
14	2	18.7	196	9 49 57.63	50 8.50	14 32 26.3	31 29.9	8.2651	8.979	2.58	3.32
15	2	15.2	197	9 50 24.22	50 35.16	14 30 8.6	29 11.8	8.2676	8.982	2.57	3.31
16	2	11.7	198	9 50 50.96	51 1.97	14 27 50.0	26 52.8	8.2699	8.985	2.55	3.30
17	2	8.2	199	9 51 17.84	51 28.92	14 25 30.5	24 33.0	8.2723	8.987	2.53	3.29
18	2	4.7	200	9 51 44.87	51 56.01	14 23 10.2	22 12.3	8.2746	8.990	2.51	3.28
19	2	1.2	201	9 52 12.04	52 23.24	14 20 49.1	19 50.8	8.2767	8.992	2.50	3.27
20	1	57.7	202	9 52 39.33	52 50.59	14 18 27.2	17 28.6	8.2786	8.995	2.48	3.26
21	1	54.2	203	9 53 6.74	53 18.06	14 16 4.5	15 5.6	8.2805	8.997	2.46	3.25
22	1	50.7	204	9 53 34.27	53 45.65	14 13 41.1	12 41.8	8.2824	8.999	2.44	3.24
23	1	47.3	205	9 54 1.92	54 13.36	14 11 17.0	10 17.3	8.2842	9.002	2.42	3.23
24	1	43.8	206	9 54 29.68	54 41.17	14 8 52.1	7 52.2	8.2859	9.004	2.41	3.22
25	1	40.3	207	9 54 57.55	55 9.09	14 6 26.6	5 26.4	8.2876	9.006	2.39	3.20
26	1	36.9	208	9 55 25.53	55 37.12	14 4 0.4	2 59.9	8.2893	9.008	2.37	3.19
27	1	33.4	209	9 55 53.61	56 5.25	14 1 33.5	0 32.7	8.2907	9.010	2.35	3.18
28	1	30.0	210	9 56 21.78	56 33.47	13 59 6.0	58 4.9	8.2921	9.011	2.33	3.16
29	1	26.5	211	9 56 50.04	57 1.78	13 56 37.9	55 36.5	8.2935	9.013	2.31	3.15
30	1	23.0	212	9 57 18.39	57 30.18	13 54 9.2	53 7.5	8.2948	9.015	2.29	3.13
31	1	19.6	213	9 57 46.82	57 58.65	13 51 39.9	50 37.9	8.2960	9.016	2.27	3.12
Aug.	1	16.1	214	9 58 15.33	58 27.20	13 49 10.1	48 7.8	8.2972	9.018	2.25	3.10
2	1	12.7	215	9 58 43.92	58 55.83	13 46 39.8	45 37.3	8.2985	9.019	2.23	3.08
3	1	9.2	216	9 59 12.59	59 24.54	13 44 9.0	43 6.3	8.2996	9.021	2.20	3.06
4	1	5.8	217	9 59 41.33	59 53.32	13 41 37.7	40 34.7	8.3006	9.022	2.17	3.04
5	1	2.4	218	10 0 10.13	0 22.16	13 39 5.9	38 2.6	8.3015	9.024	2.14	3.02
6	0	58.9	219	10 0 38.99	0 51.05	13 36 33.6	35 30.0	8.3024	9.025	2.11	3.00
7	0	55.5	220	10 1 7.91	1 20.00	13 34 0.8	32 57.0	8.3033	9.026	2.08	2.98
8	0	52.0	221	10 1 36.89	1 49.01	13 31 27.5	30 23.5	8.3040	9.028	2.04	2.96
9	0	48.6	222	10 2 5.91	2 18.07	13 28 53.9	27 49.6	8.3047	9.029	2.00	2.94
10	0	45.1	223	10 2 34.98	2 47.17	13 26 19.9	25 15.4	8.3055	9.030	1.95	2.92
11	0	41.6	224	10 3 4.10	3 16.31	13 23 45.6	22 40.9	8.3061	9.031	1.91	2.89
12	0	38.2	225	10 3 33.36	3 45.49	13 21 10.9	20 6.0	8.3067	9.032	1.86	2.86
13	0	34.7	226	10 4 2.45	4 14.70	13 18 35.9	17 30.8	8.3071	9.032	1.82	2.83
14	0	31.3	227	10 4 31.67	4 43.94	13 16 0.6	14 55.3	8.3076	9.033	1.77	2.80
15	0	27.8	228	10 5 0.92	5 13.21	13 13 25.0	12 19.6	8.3079	9.034	1.73	2.76
16	0	24.4	229	10 5 30.19	5 42.50	13 10 49.2	9 43.6	8.3082	9.034	+1.68	2.72
17	0	21.0	230	10 5 59.48	6 11.81	13 8 13.2	7 7.5	8.3085	9.035		-2.68
18	0	17.5	231	10 6 28.79	6 41.13	13 5 37.0	4 31.2	8.3087	9.036		
19	0	14.1	232	10 6 58.10	7 10.46	13 3 0.6	1 54.7	8.3087	9.036		
20	0	10.6	233	10 7 27.42	7 39.79	12 60 24.0	59 18.0	8.3088	9.036		
21	0	7.1	234	10 7 56.74	8 9.12	12 57 47.4	56 41.3	8.3087	9.037		
22	0	3.7	235	10 8 26.05	8 38.44	12 55 10.7	54 4.5	8.3086	9.037		
23	0	0.2	236	10 8 55.35	9 7.75	12 52 33.9	51 27.6	8.3084	9.037		
23	23	56.8	237	10 9 24.64	9 37.04	12 49 57.1	48 50.7	8.3082	9.037	-1.68	
24	23	53.3	238	10 9 53.91	10 6.31	12 47 20.3	46 13.8	8.3080	9.037	1.74	
25	23	49.9	239	10 10 23.17	10 35.57	12 44 43.4	43 36.9	8.3078	9.037	1.80	
26	23	46.5	240	10 10 52.41	11 4.81	12 42 6.6	41 0.1	8.3074	9.037	1.86	
27	23	43.0	241	10 11 21.62	11 34.02	12 39 29.8	38 23.3	8.3069	9.037	1.91	
28	23	39.6	242	10 11 50.79	12 3.19	12 36 53.1	35 46.5	8.3064	9.037	1.96	
29	23	36.2	243	10 12 19.93	12 32.32	12 34 16.5	33 9.8	8.3058	9.036	2.00	
30	23	32.7	244	10 12 49.03	13 1.41	12 31 40.0	30 33.3	8.3052	9.036	2.04	
31	23	29.3	245	10 13 18.09	13 30.46	+12 29 3.6	27 57.0	+8.3046	- 9.036	-2.09	+2.68



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
		h. m. s.	m. s.	° ' "	' "				
Sep. 1 23 25.8	246	10 13 47.10	13 59.46	+12 26 27.4	25 20.9	+8.3038	- 9.035	-2.11	+2.72
2 23 22.4	247	10 14 16.06	14 28.41	12 23 51.4	22 44.9	8.3031	9.034	2.14	2.76
3 23 18.9	248	10 14 44.97	14 57.31	12 21 15.6	20 9.1	8.3023	9.034	2.17	2.80
4 23 15.4	249	10 15 13.83	15 26.15	12 18 39.9	17 33.5	8.3015	9.034	2.20	2.83
5 23 12.0	250	10 15 42.63	15 54.93	12 16 4.4	14 58.1	8.3006	9.033	2.23	2.86
6 23 8.5	251	10 16 11.37	16 23.65	12 13 29.2	12 23.0	8.2995	9.032	2.25	2.89
7 23 5.1	252	10 16 40.03	16 52.29	12 10 54.4	9 48.2	8.2984	9.031	2.27	2.92
8 23 1.6	253	10 17 8.62	17 20.86	12 8 19.9	7 13.8	8.2973	9.030	2.29	2.94
9 22 58.1	254	10 17 37.13	17 49.35	12 5 45.7	4 39.7	8.2961	9.029	2.31	2.96
10 22 54.7	255	10 18 5.57	18 17.75	12 3 11.9	2 6.0	8.2949	9.028	2.33	2.98
11 22 51.2	256	10 18 33.92	18 46.07	11 60 38.5	59 32.7	8.2935	9.027	2.35	3.01
12 22 47.8	257	10 19 2.18	19 14.30	11 58 5.5	56 59.9	8.2921	9.026	2.37	3.03
13 22 44.3	258	10 19 30.34	19 42.43	11 55 33.0	54 27.5	8.2905	9.024	2.39	3.06
14 22 40.8	259	10 19 58.40	20 10.45	11 53 1.0	51 55.6	8.2890	9.023	2.41	3.08
15 22 37.4	260	10 20 26.36	20 38.37	11 50 29.5	49 24.3	8.2873	9.021	2.42	3.10
16 22 33.9	261	10 20 54.21	21 6.18	11 47 58.5	46 53.6	8.2856	9.020	2.44	3.12
17 22 30.5	262	10 21 21.95	21 33.88	11 45 28.1	44 23.4	8.2839	9.018	2.45	3.14
18 22 27.0	263	10 21 49.58	22 1.47	11 42 58.3	41 53.8	8.2821	9.016	2.47	3.16
19 22 23.5	264	10 22 17.09	22 28.93	11 40 29.1	39 24.8	8.2801	9.014	2.48	3.18
20 22 20.1	265	10 22 44.47	22 56.26	11 38 0.6	36 56.5	8.2780	9.012	2.49	3.20
21 22 16.6	266	10 23 11.71	23 23.46	11 35 32.8	34 29.0	8.2758	9.010	2.51	3.22
22 22 13.1	267	10 23 38.82	23 50.52	11 33 5.7	32 2.2	8.2737	9.008	2.52	3.24
23 22 9.7	268	10 24 5.80	24 17.45	11 30 39.4	29 36.2	8.2716	9.006	2.54	3.25
24 22 6.2	269	10 24 32.64	24 44.24	11 28 13.8	27 10.9	8.2693	9.004	2.55	3.27
25 22 2.7	270	10 24 59.34	25 10.88	11 25 49.0	24 46.4	8.2669	9.001	2.56	3.28
26 21 59.2	271	10 25 25.89	25 37.37	11 23 25.0	22 22.7	8.2645	8.999	2.57	3.29
27 21 55.7	272	10 25 52.29	26 3.71	11 21 1.8	19 59.8	8.2619	8.996	2.58	3.30
28 21 52.2	273	10 26 18.53	26 29.89	11 18 39.5	17 37.8	8.2593	8.994	2.59	3.31
29 21 48.7	274	10 26 44.61	26 55.91	11 16 18.0	15 16.7	8.2566	8.991	2.60	3.32
30 21 45.2	275	10 27 10.53	27 21.76	11 13 57.5	12 56.6	8.2538	8.988	2.61	3.33
Oct. 1 21 41.7	276	10 27 36.28	27 47.44	11 11 37.9	10 37.4	8.2511	8.985	2.62	3.34
2 21 38.2	277	10 28 1.87	28 12.96	11 9 19.3	8 19.2	8.2482	8.982	2.63	3.35
3 21 34.7	278	10 28 27.28	28 38.30	11 7 1.7	6 2.0	8.2451	8.979	2.64	3.36
4 21 31.1	279	10 28 52.51	29 3.45	11 4 45.1	3 45.8	8.2419	8.975	2.65	3.37
5 21 27.6	280	10 29 17.55	29 28.42	11 2 29.5	1 30.6	8.2386	8.972	2.66	3.38
6 21 24.1	281	10 29 42.40	29 53.20	10 60 15.0	59 16.5	8.2354	8.969	2.67	3.39
7 21 20.6	282	10 30 7.07	30 17.79	10 58 1.6	57 3.5	8.2320	8.965	2.68	3.40
8 21 17.1	283	10 30 31.54	30 42.18	10 55 49.3	54 51.7	8.2285	8.961	2.69	3.41
9 21 13.5	284	10 30 55.81	31 6.37	10 53 38.2	52 41.1	8.2249	8.957	2.70	3.42
10 21 10.0	285	10 31 19.88	31 30.36	10 51 28.2	50 31.6	8.2212	8.954	2.70	3.43
11 21 6.5	286	10 31 43.74	31 54.13	10 49 19.4	48 23.3	8.2173	8.949	2.71	3.44
12 21 2.9	287	10 32 7.38	32 17.68	10 47 11.9	46 16.3	8.2133	8.945	2.72	3.45
13 20 59.4	288	10 32 30.80	32 41.01	10 45 5.8	44 10.7	8.2092	8.940	2.73	3.47
14 20 55.8	289	10 32 54.00	33 4.12	10 43 1.0	42 6.5	8.2051	8.936	2.74	3.48
15 20 52.3	290	10 33 16.98	33 27.00	10 40 57.5	40 3.6	8.2007	8.931	2.74	3.49
16 20 48.7	291	10 33 39.72	33 49.65	10 38 55.4	38 2.1	8.1961	8.926	2.75	3.50
17 20 45.1	292	10 34 2.22	34 12.06	10 36 54.7	36 2.0	8.1915	8.921	2.76	3.52
18 20 41.6	293	10 34 24.48	34 34.22	10 34 55.4	34 3.3	8.1868	8.916	2.77	3.53
19 20 38.0	294	10 34 46.50	34 56.13	10 32 57.6	32 6.1	8.1820	8.910	2.78	3.54
20 20 34.4	295	10 35 8.27	35 17.79	10 31 1.3	30 10.4	8.1769	8.904	2.78	3.56
21 20 30.9	296	10 35 29.78	35 39.19	10 29 6.5	28 16.3	8.1716	8.899	2.79	3.57
22 20 27.3	297	10 35 51.03	36 0.33	10 27 13.2	26 23.7	8.1663	8.893	2.80	3.58
23 20 23.7	298	10 36 12.02	36 21.21	10 25 21.4	24 32.6	8.1610	8.887	2.80	3.59
24 20 20.1	299	10 36 32.75	36 41.83	10 23 31.2	22 43.1	8.1555	8.880	2.81	3.60
25 20 16.5	300	10 36 53.22	37 2.18	10 21 42.7	20 55.3	8.1498	8.874	2.81	3.61
26 20 12.9	301	10 37 13.41	37 22.25	10 19 55.9	19 9.2	8.1438	8.867	2.82	3.62
27 20 9.3	302	10 37 33.32	37 42.04	10 18 10.7	17 24.7	8.1378	8.860	2.83	3.62
28 20 5.7	303	10 37 52.96	38 1.56	10 16 27.1	15 41.8	8.1317	8.853	2.84	3.63
29 20 2.1	304	10 38 12.32	38 20.80	10 14 45.2	14 0.7	8.1254	8.846	2.84	3.63
30 19 58.4	305	10 38 31.40	38 39.76	10 13 5.1	12 21.4	8.1189	8.838	2.85	3.64
31 19 54.8	306	10 38 50.19	38 58.42	10 11 26.8	10 43.8	8.1121	8.830	2.85	3.64
32 19 51.2	307	10 39 8.68	39 16.78	+10 9 50.2	9 8.0	+8.1050	- 8.823	-2.86	+3.65



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.		h. m. s.	m. s.	° ' "	° ' "				
Nov. 1 19 51.2	307	10 39 8.68	39 16.78	+10 9 50.2	9 8.0	+8.1050	- 8.823	-2.86	+3.65
2 19 47.5	308	10 39 26.87	39 34.84	10 8 15.4	7 34.0	8.0978	8.814	2.86	3.65
3 19 43.9	309	10 39 44.75	39 52.59	10 6 42.5	6 1.9	8.0902	8.805	2.87	3.66
4 19 40.2	310	10 40 2.32	40 10.03	10 5 11.5	4 31.7	8.0827	8.796	2.87	3.66
5 19 36.6	311	10 40 19.59	40 27.16	10 3 42.4	3 3.3	8.0750	8.787	2.88	3.66
6 19 33.0	312	10 40 36.55	40 43.98	10 2 15.1	1 36.3	8.0670	8.778	2.88	3.67
7 19 29.3	313	10 40 53.19	41 0.48	10 0 49.8	0 12.5	8.0585	8.767	2.89	3.67
8 19 25.7	314	10 41 9.50	41 16.65	9 59 26.5	58 50.1	8.0498	8.757	2.89	3.67
9 19 22.0	315	10 41 25.49	41 32.50	9 58 5.2	57 29.7	8.0410	8.746	2.90	3.68
10 19 18.3	316	10 41 41.15	41 48.02	9 56 46.0	56 11.4	8.0317	8.735	2.90	3.68
11 19 14.6	317	10 41 56.47	42 3.20	9 55 28.8	54 55.1	8.0221	8.723	2.91	3.68
12 19 11.0	318	10 42 11.45	42 18.03	9 54 13.7	53 40.9	8.0122	8.711	2.91	3.69
13 19 7.3	319	10 42 26.09	42 32.51	9 53 0.7	52 28.8	8.0020	8.698	2.92	3.69
14 19 3.6	320	10 42 40.38	42 46.65	9 51 49.9	51 18.9	7.9913	8.685	2.92	3.70
15 18 59.9	321	10 42 54.32	43 0.44	9 50 41.2	50 11.2	7.9804	8.672	2.93	3.70
16 18 56.2	322	10 43 7.91	43 13.87	9 49 34.7	49 5.7	7.9691	8.657	2.93	3.70
17 18 52.5	323	10 43 21.14	43 26.94	9 48 30.4	48 2.3	7.9573	8.642	2.93	3.71
18 18 48.8	324	10 43 34.01	43 39.65	9 47 28.3	47 1.2	7.9451	8.627	2.94	3.71
19 18 45.0	325	10 43 46.52	43 52.00	9 46 28.4	46 2.3	7.9326	8.611	2.94	3.72
20 18 41.3	326	10 43 58.67	44 3.99	9 45 30.8	45 5.7	7.9196	8.594	2.94	3.72
21 18 37.6	327	10 44 10.45	44 15.61	9 44 35.4	44 11.3	7.9059	8.576	2.95	3.72
22 18 33.8	328	10 44 21.86	44 26.85	9 43 42.3	43 19.2	7.8918	8.557	2.95	3.73
23 18 30.1	329	10 44 32.90	44 37.72	9 42 51.5	42 29.4	7.8771	8.538	2.95	3.73
24 18 26.3	330	10 44 43.56	44 48.21	9 42 3.0	41 41.9	7.8618	8.517	2.96	3.74
25 18 22.6	331	10 44 53.85	44 58.33	9 41 16.8	40 56.8	7.8457	8.495	2.96	3.74
26 18 18.8	332	10 45 3.75	45 8.06	9 40 32.9	40 14.0	7.8289	8.472	2.96	3.74
27 18 15.0	333	10 45 13.27	45 17.41	9 39 51.4	39 33.5	7.8113	8.447	2.97	3.75
28 18 11.2	334	10 45 22.40	45 26.37	9 39 12.3	38 55.5	7.7927	8.420	2.97	3.75
29 18 7.4	335	10 45 31.14	45 34.93	9 38 35.7	38 19.9	7.7734	8.391	2.97	3.76
30 18 3.6	336	10 45 39.49	45 43.11	9 38 1.4	37 46.7	7.7531	8.361	2.98	3.76
Dec. 1 17 59.8	337	10 45 47.45	45 50.89	9 37 29.5	37 15.9	7.7315	8.329	2.98	3.76
2 17 56.0	338	10 45 55.01	45 58.27	9 37 0.0	36 47.5	7.7088	8.293	2.98	3.76
3 17 52.2	339	10 46 2.18	46 5.26	9 36 32.9	36 21.5	7.6849	8.254	2.99	3.77
4 17 48.3	340	10 46 8.95	46 11.85	9 36 8.3	35 58.0	7.6592	8.211	2.99	3.77
5 17 44.5	341	10 46 15.32	46 18.04	9 35 46.1	35 36.9	7.6316	8.163	2.99	3.77
6 17 40.7	342	10 46 21.28	46 23.82	9 35 26.4	35 18.3	7.6017	8.108	2.99	3.77
7 17 36.8	343	10 46 26.83	46 29.19	9 35 9.2	35 2.2	7.5696	8.043	3.00	3.78
8 17 33.0	344	10 46 31.97	46 34.15	9 34 54.6	34 48.7	7.5349	7.967	3.00	3.78
9 17 29.1	345	10 46 36.70	46 38.70	9 34 42.5	34 37.7	7.4973	7.879	3.00	3.78
10 17 25.3	346	10 46 41.02	46 42.83	9 34 32.8	34 29.2	7.4560	7.768	3.00	3.78
11 17 21.4	347	10 46 44.93	46 46.55	9 34 25.6	34 23.2	7.4104	7.612	3.00	3.78
12 17 17.5	348	10 46 48.43	46 49.86	9 34 21.0	34 19.7	7.3588	7.360	3.01	3.78
13 17 13.7	349	10 46 51.51	46 52.75	9 34 19.0	34 18.8	7.2988	- 6.717	3.01	3.78
14 17 9.8	350	10 46 54.16	46 55.22	9 34 19.5	34 20.5	7.2290	+ 7.085	3.01	3.78
15 17 5.9	351	10 46 56.39	46 57.27	9 34 22.5	34 24.7	7.1481	7.470	3.01	3.78
16 17 2.0	352	10 46 58.21	46 58.90	9 34 28.0	34 31.3	7.0498	7.671	3.01	3.78
17 16 58.1	353	10 46 59.62	47 0.12	9 34 36.0	34 40.4	6.9208	7.810	3.01	3.78
18 16 54.1	354	10 47 0.61	47 0.92	9 34 46.6	34 52.1	6.7337	7.915	3.01	3.78
19 16 50.2	355	10 47 1.18	47 1.30	9 34 59.7	35 6.3	+6.3979	7.998	3.01	3.78
20 16 46.3	356	10 47 1.33	47 1.26	9 35 15.3	35 23.1	-5.5820	8.068	3.01	3.78
21 16 42.3	357	10 47 1.07	47 0.81	9 35 33.4	35 42.3	6.5137	8.128	3.01	3.78
22 16 38.4	358	10 47 0.39	46 59.95	9 35 54.0	36 4.0	6.7886	8.180	3.00	3.78
23 16 34.4	359	10 46 59.30	46 58.67	9 36 17.0	36 28.1	6.9549	8.225	3.00	3.77
24 16 30.5	360	10 46 57.80	46 56.98	9 36 42.4	36 54.6	7.0746	8.267	3.00	3.77
25 16 26.5	361	10 46 55.88	46 54.88	9 37 10.3	37 23.6	7.1690	8.306	3.00	3.77
26 16 22.5	362	10 46 53.55	46 52.37	9 37 40.6	37 55.0	7.2448	8.341	3.00	3.77
27 16 18.5	363	10 46 50.82	46 49.46	9 38 13.4	38 28.9	7.3093	8.373	3.00	3.77
28 16 14.5	364	10 46 47.68	46 46.14	9 38 48.6	39 5.2	7.3654	8.402	3.00	3.76
29 16 10.5	365	10 46 44.14	46 42.42	9 39 26.1	39 43.8	7.4151	8.429	3.00	3.76
30 16 6.5	366	10 46 40.19	46 38.29	9 40 6.0	40 24.7	7.4597	8.455	3.00	3.76
31 16 2.5	367	10 46 35.84	46 33.76	9 40 48.3	41 8.0	7.5001	8.480	2.99	3.75
32 15 58.5	368	10 46 31.03	46 28.82	+ 9 41 32.9	41 53.7	-7.5371	+ 8.503	-2.99	+3.75



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
Jan.	d.	h. m.		h. m. s.	m. s.	° ' "	° ' "				
	0	9 29.7	0	4 9 46.25	9 44.83	+20 56 26.3	56 22.7	-7.7540	- 8.168	+2.60	+3.02
	1	9 25.7	1	4 9 38.14	9 36.75	20 56 5.6	56 2.1	7.7453	8.153	2.60	3.02
	2	9 21.6	2	4 9 30.22	9 28.86	20 55 45.4	55 42.0	7.7354	8.143	2.61	3.03
	3	9 17.5	3	4 9 22.48	9 21.15	20 55 25.8	55 22.3	7.7259	8.132	2.61	3.03
	4	9 13.5	4	4 9 14.90	9 13.60	20 55 6.4	55 3.1	7.7167	8.120	2.61	3.03
	5	9 9.4	5	4 9 7.47	9 6.20	20 54 47.6	54 44.4	7.7074	8.111	2.62	3.04
	6	9 5.4	6	4 9 0.21	8 58.97	20 54 29.2	54 26.1	7.6972	8.099	2.62	3.04
	7	9 1.3	7	4 8 53.13	8 51.90	20 54 11.4	54 8.4	7.6867	8.087	2.63	3.05
	8	8 57.3	8	4 8 46.22	8 45.04	20 53 54.0	53 51.0	7.6748	8.075	2.63	3.05
	9	8 53.3	9	4 8 39.50	8 38.36	20 53 37.2	53 34.3	7.6625	8.062	2.64	3.05
	10	8 49.2	10	4 8 32.97	8 31.86	20 53 20.8	53 18.0	7.6506	8.051	2.64	3.06
	11	8 45.2	11	4 8 26.61	8 25.53	20 53 4.8	53 2.2	7.6383	8.040	2.64	3.06
	12	8 41.2	12	4 8 20.43	8 19.38	20 52 49.2	52 46.6	7.6263	8.029	2.65	3.06
	13	8 37.1	13	4 8 14.42	8 13.41	20 52 34.0	52 31.5	7.6133	8.018	2.65	3.07
	14	8 33.1	14	4 8 8.60	8 7.62	20 52 19.3	52 16.9	7.5983	8.003	2.66	3.07
	15	8 29.1	15	4 8 2.99	8 2.04	20 52 5.1	52 2.8	7.5820	7.985	2.66	3.07
	16	8 25.1	16	4 7 57.59	7 56.67	20 51 51.5	51 49.3	7.5660	7.969	2.66	3.08
	17	8 21.0	17	4 7 52.39	7 51.52	20 51 38.4	51 36.3	7.5510	7.952	2.67	3.08
	18	8 17.0	18	4 7 47.35	7 46.50	20 51 25.8	51 23.8	7.5372	7.935	2.67	3.09
	19	8 13.0	19	4 7 42.46	7 41.64	20 51 13.7	51 11.7	7.5220	7.914	2.68	3.09
	20	8 9.0	20	4 7 37.76	7 36.97	20 51 2.2	51 0.3	7.5035	7.891	2.68	3.10
	21	8 5.0	21	4 7 33.27	7 32.52	20 50 51.3	50 49.5	7.4817	7.871	2.69	3.10
	22	8 1.0	22	4 7 28.98	7 28.26	20 50 40.9	50 39.2	7.4593	7.850	2.69	3.10
	23	7 57.0	23	4 7 24.93	7 24.25	20 50 31.0	50 29.4	7.4341	7.828	2.70	3.11
	24	7 53.0	24	4 7 21.11	7 20.47	20 50 21.6	50 20.1	7.4122	7.810	2.70	3.11
	25	7 49.0	25	4 7 17.49	7 16.89	20 50 12.5	50 11.1	7.3882	7.776	2.71	3.12
	26	7 45.0	26	4 7 14.07	7 13.50	20 50 4.2	50 2.9	7.3628	7.745	2.71	3.12
	27	7 41.0	27	4 7 10.85	7 10.32	20 49 56.5	49 55.3	7.3331	7.711	2.71	3.13
	28	7 37.0	28	4 7 7.86	7 7.37	20 49 49.4	49 48.3	7.2996	7.674	2.72	3.13
	29	7 33.0	29	4 7 5.10	7 4.64	20 49 42.9	49 41.9	7.2649	7.641	2.72	3.14
	30	7 29.1	30	4 7 2.55	7 2.13	20 49 36.9	49 36.0	7.2219	7.597	2.72	3.14
Feb.	31	7 25.1	31	4 7 0.19	6 59.81	20 49 31.5	49 30.7	7.1858	7.549	2.72	3.14
	1	7 21.1	32	4 6 58.03	6 57.69	20 49 26.7	49 26.0	7.1492	7.495	2.72	3.14
	2	7 17.2	33	4 6 56.12	6 55.81	20 49 22.5	49 21.9	7.0970	7.433	2.72	3.15
	3	7 13.2	34	4 6 54.43	6 54.16	20 49 18.9	49 18.4	7.0403	7.373	2.72	3.15
	4	7 9.3	35	4 6 52.96	6 52.72	20 49 15.8	49 15.3	6.9752	7.289	2.73	3.15
	5	7 5.3	36	4 6 51.70	6 51.51	20 49 13.3	49 12.9	6.9024	7.184	2.73	3.15
	6	7 1.4	37	4 6 50.66	6 50.51	20 49 11.4	49 11.2	6.8055	7.046	2.73	3.15
	7	6 57.4	38	4 6 49.85	6 49.73	20 49 10.1	49 10.0	6.6805	6.842	2.73	3.16
	8	6 53.5	39	4 6 49.27	6 49.19	20 49 9.4	49 9.4	6.5138	- 6.319	2.73	3.16
	9	6 49.5	40	4 6 48.91	6 48.87	20 49 9.5	49 9.6	6.2396	+ 6.319	2.73	3.16
	10	6 45.6	41	4 6 48.77	6 48.76	20 49 10.1	49 10.3	-5.3188	6.745	2.73	3.16
	11	6 41.6	42	4 6 48.84	6 48.88	20 49 11.2	49 11.5	+6.0721	6.988	2.73	3.16
	12	6 37.7	43	4 6 49.14	6 49.22	20 49 12.8	49 13.2	6.4544	7.120	2.73	3.16
	13	6 33.8	44	4 6 49.66	6 49.78	20 49 14.9	49 15.4	6.6410	7.239	2.73	3.16
	14	6 29.9	45	4 6 50.39	6 50.54	20 49 17.7	49 18.3	6.7660	7.347	2.73	3.16
	15	6 26.0	46	4 6 51.35	6 51.55	20 49 21.2	49 21.9	6.8711	7.421	2.73	3.15
	16	6 22.1	47	4 6 52.53	6 52.76	20 49 25.3	49 26.1	6.9523	7.485	2.73	3.15
	17	6 18.2	48	4 6 53.94	6 54.21	20 49 30.0	49 30.9	7.0235	7.540	2.73	3.15
	18	6 14.3	49	4 6 55.58	6 55.89	20 49 35.3	49 36.3	7.0822	7.590	2.73	3.15
	19	6 10.4	50	4 6 57.43	6 57.78	20 49 41.1	49 42.2	7.1317	7.634	2.73	3.15
	20	6 6.5	51	4 6 59.48	6 59.87	20 49 47.6	49 48.8	7.1761	7.674	2.73	3.15
	21	6 2.6	52	4 7 1.76	7 2.19	20 49 54.7	49 56.0	7.2201	7.711	2.73	3.14
	22	5 58.7	53	4 7 4.27	7 4.73	20 50 2.4	50 3.8	7.2600	7.745	2.73	3.14
	23	5 54.8	54	4 7 7.01	7 7.51	20 50 10.7	50 12.2	7.2981	7.776	2.72	3.14
	24	5 51.0	55	4 7 10.00	7 10.54	20 50 19.5	50 21.1	7.3302	7.801	2.72	3.14
	25	5 47.1	56	4 7 13.18	7 13.76	20 50 28.9	50 30.6	7.3562	7.828	2.72	3.14
	26	5 43.2	57	4 7 16.55	7 17.17	20 50 38.9	50 40.7	7.3845	7.854	2.72	3.14
	27	5 39.3	58	4 7 20.17	7 20.82	20 50 49.5	50 51.4	7.4146	7.879	2.71	3.13
	28	5 35.4	59	4 7 24.03	7 24.72	20 51 0.7	51 2.7	7.4394	7.898	2.71	3.13
	29	5 31.6	60	4 7 28.09	7 28.82	20 51 12.4	51 14.4	7.4597	7.917	2.71	3.13
	30	5 27.7	61	4 7 32.34	7 33.11	+20 51 24.6	51 26.7	+7.4802	+ 7.938	+2.71	+3.12



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
Mar.	d.	h. m.		h. m. s.	m. s.	° ' "	° ' "				
	1	5 27.7	61	4 7 32.34	7 33.11	+20 51 24.6	51 26.7	+7.4802	+ 7.938	+2.71	+3.12
	2	5 23.9	62	4 7 36.79	7 37.59	20 51 37.4	51 39.6	7.5007	7.959	2.70	3.12
	3	5 20.0	63	4 7 41.46	7 42.30	20 51 50.8	51 53.1	7.5211	7.978	2.70	3.12
	4	5 16.2	64	4 7 46.35	7 47.23	20 52 4.8	52 7.2	7.5407	7.994	2.70	3.12
	5	5 14.3	65	4 7 51.48	7 52.38	20 52 19.2	52 21.7	7.5594	8.009	2.69	3.11
	6	5 8.5	66	4 7 56.79	7 57.74	20 52 34.1	52 36.7	7.5757	8.023	2.69	3.11
	7	5 4.6	67	4 8 2.31	8 3.29	20 52 49.6	52 52.3	7.5914	8.040	2.69	3.11
	8	5 0.8	68	4 8 8.03	8 9.05	20 53 5.7	53 8.5	7.6066	8.051	2.68	3.10
	9	4 56.9	69	4 8 13.95	8 15.00	20 53 22.2	53 25.1	7.6206	8.067	2.68	3.10
	10	4 53.1	70	4 8 20.06	8 21.15	20 53 39.3	53 42.3	7.6348	8.080	2.68	3.10
	11	4 49.3	71	4 8 26.38	8 27.50	20 53 56.9	53 59.9	7.6492	8.092	2.68	3.09
	12	4 45.4	72	4 8 32.91	8 34.07	20 54 15.0	54 18.1	7.6625	8.104	2.67	3.09
	13	4 41.6	73	4 8 39.62	8 40.81	20 54 33.6	54 36.8	7.6742	8.118	2.67	3.08
	14	4 37.8	74	4 8 46.52	8 47.75	20 54 52.7	54 56.0	7.6868	8.132	2.67	3.08
	15	4 34.0	75	4 8 53.62	8 54.88	20 55 12.6	55 16.0	7.6990	8.140	2.66	3.08
	16	4 30.2	76	4 9 0.93	9 2.22	20 55 32.7	55 36.2	7.7115	8.151	2.66	3.07
	17	4 26.4	77	4 9 8.45	9 9.77	20 55 53.3	55 56.9	7.7231	8.162	2.66	3.07
	18	4 22.6	78	4 9 16.16	9 17.50	20 56 14.4	56 18.1	7.7332	8.172	2.65	3.07
	19	4 18.8	79	4 9 24.03	9 25.39	20 56 36.0	56 39.7	7.7432	8.182	2.65	3.06
	20	4 15.0	80	4 9 32.10	9 33.48	20 56 58.2	57 2.0	7.7529	8.194	2.64	3.06
	21	4 11.2	81	4 9 40.34	9 41.78	20 57 21.1	57 25.0	7.7628	8.203	2.64	3.06
	22	4 7.4	82	4 9 48.77	9 50.25	20 57 44.3	57 48.2	7.7721	8.209	2.63	3.05
	23	4 3.6	83	4 9 57.38	9 58.88	20 58 7.8	58 11.8	7.7812	8.216	2.63	3.05
	24	3 59.8	84	4 10 6.18	10 7.71	20 58 31.7	58 35.7	7.7901	8.222	2.62	3.04
	25	3 56.1	85	4 10 15.15	10 16.70	20 58 55.8	58 59.9	7.7983	8.227	2.62	3.04
	26	3 52.3	86	4 10 24.29	10 25.87	20 59 20.2	59 24.4	7.8064	8.234	2.61	3.03
	27	3 48.5	87	4 10 33.60	10 35.21	20 59 45.1	59 49.3	7.8143	8.239	2.61	3.03
	28	3 44.7	88	4 10 43.07	10 44.71	21 0 10.2	0 14.5	7.8221	8.245	2.60	3.02
	29	3 40.9	89	4 10 52.73	10 54.40	21 0 35.7	0 40.0	7.8307	8.250	2.59	3.01
	30	3 37.2	90	4 11 2.55	11 4.27	21 1 1.6	1 5.8	7.8382	8.256	2.58	3.00
	31	3 33.5	91	4 11 12.53	11 14.28	21 1 27.8	1 32.0	7.8447	8.262	2.58	2.99
Apr.	1	3 29.7	92	4 11 22.66	11 24.43	21 1 54.2	1 58.6	7.8508	8.268	2.57	2.98
	2	3 26.0	93	4 11 32.93	11 34.72	21 2 21.0	2 25.6	7.8568	8.273	2.57	2.97
	3	3 22.2	94	4 11 43.35	11 45.17	21 2 48.5	2 53.1	7.8627	8.278	2.56	2.96
	4	3 18.4	95	4 11 53.92	11 55.77	21 3 16.5	3 21.2	7.8685	8.283	2.56	2.94
	5	3 14.7	96	4 12 4.64	12 6.52	21 3 44.9	3 49.7	7.8742	8.288	2.55	2.93
	6	3 10.9	97	4 12 15.52	12 17.42	21 4 13.7	4 18.6	7.8798	8.293	2.55	2.91
	7	3 7.2	98	4 12 26.55	12 28.48	21 4 42.9	4 47.9	7.8853	8.298	2.54	2.89
	8	3 3.4	99	4 12 37.72	12 39.68	21 5 12.7	5 17.8	7.8907	8.303	2.54	2.87
	9	2 59.6	100	4 12 49.04	12 51.02	21 5 43.1	5 48.3	7.8961	8.308	2.53	2.86
	10	2 55.9	101	4 13 0.49	13 2.49	21 6 13.7	6 19.0	7.9014	8.312	2.52	2.84
	11	2 52.2	102	4 13 12.07	13 14.09	21 6 44.5	6 49.8	7.9066	8.316	2.51	2.82
	12	2 48.4	103	4 13 23.78	13 25.83	21 7 15.5	7 20.9	7.9117	8.320	2.50	2.80
	13	2 44.7	104	4 13 35.62	13 37.69	21 7 46.7	7 52.1	7.9167	8.324	2.49	2.78
	14	2 41.0	105	4 13 47.58	13 49.68	21 8 17.9	8 23.3	7.9217	8.328	2.48	2.75
	15	2 37.2	106	4 13 59.68	14 1.81	21 8 49.3	8 54.8	7.9254	8.332	2.47	2.72
	16	2 33.5	107	4 14 11.91	14 14.07	21 9 20.8	9 26.3	7.9300	8.336	2.46	2.69
	17	2 29.8	108	4 14 24.27	14 26.45	21 9 52.5	9 58.0	7.9345	8.339	2.45	2.66
	18	2 26.0	109	4 14 36.76	14 38.96	21 10 24.4	10 30.0	7.9389	8.342	2.44	2.63
	19	2 22.3	110	4 14 49.37	14 51.59	21 10 56.4	11 2.0	7.9444	8.345	2.43	2.60
	20	2 18.6	111	4 15 2.09	15 4.33	21 11 28.6	11 34.2	7.9484	8.348	2.41	2.56
	21	2 14.9	112	4 15 14.92	15 17.18	21 12 1.1	12 6.7	7.9522	8.351	2.40	2.52
	22	2 11.2	113	4 15 27.86	15 30.14	21 12 33.8	12 39.5	7.9558	8.354	2.38	2.48
	23	2 7.5	114	4 15 40.91	15 43.21	21 13 6.7	13 12.2	7.9592	8.357	2.37	2.44
	24	2 3.8	115	4 15 54.08	15 56.40	21 13 39.3	13 45.0	7.9625	8.360	2.35	+2.40
	25	2 0.0	116	4 16 7.33	16 9.69	21 14 12.2	14 18.0	7.9656	8.362	2.34	
	26	1 56.3	117	4 16 20.66	16 23.03	21 14 45.4	14 51.2	7.9685	8.364	2.32	
	27	1 52.6	118	4 16 34.07	16 36.46	21 15 18.8	15 24.7	7.9713	8.366	2.31	
	28	1 48.9	119	4 16 47.56	16 49.97	21 15 52.5	15 58.4	7.9739	8.368	2.30	
	29	1 45.2	120	4 17 1.13	17 3.56	21 16 26.5	16 32.5	7.9764	8.370	2.29	
	30	1 41.5	121	4 17 14.78	17 17.23	21 17 0.7	17 6.8	7.9789	8.372	2.27	
	31	1 37.8	122	4 17 28.51	17 30.98	+21 17 35.1	17 41.2	+7.9813	+ 8.374	+2.25	



FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.																				
Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> <sup>2</sup> .										
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.									
May	d.	h.	m.	h.	m.	s.	m.	s.	°	'	"	°	'	"	°	'	"	°	'	"
	1	1	37.8	122	4	17	28.51	17	30.98	+21	17	35.1	17	41.2	+7.9813	+8.374	+2.25			
	2	1	34.1	123	4	17	42.32	17	44.80	21	18	9.7	18	15.9	7.9836	8.376	2.23			
	3	1	30.4	124	4	17	56.21	17	58.71	21	18	44.5	18	50.8	7.9858	8.378	2.21			
	4	1	26.7	125	4	18	10.19	18	12.71	21	19	19.5	19	25.8	7.9880	8.380	2.19			
	5	1	23.0	126	4	18	24.24	18	26.78	21	19	54.5	20	0.8	7.9902	8.382	2.17			
	6	1	19.3	127	4	18	38.36	18	40.92	21	20	29.5	20	35.8	7.9923	8.383	2.15			
	7	1	15.6	128	4	18	52.54	18	55.11	21	21	4.5	21	10.8	7.9943	8.384	2.13			
	8	1	11.9	129	4	19	6.78	19	9.36	21	21	39.5	21	45.9	7.9962	8.385	2.11			
	9	1	8.2	130	4	19	21.09	19	23.69	21	22	14.5	22	21.0	7.9981	8.385	2.08			
	0	1	4.5	131	4	19	35.46	19	38.07	21	22	49.7	22	56.2	7.9999	8.386	+2.06			
	11	1	0.8	132	4	19	49.88	19	52.50	21	23	24.9	23	31.4	8.0016	8.386				
	12	0	57.1	133	4	20	4.35	20	6.98	21	24	0.1	24	6.6	8.0032	8.386				
	13	0	53.4	134	4	20	18.87	20	21.51	21	24	35.3	24	41.8	8.0047	8.386				
	14	0	49.7	135	4	20	33.45	20	36.10	21	25	10.5	25	17.0	8.0060	8.387				
	15	0	46.0	136	4	20	48.07	20	50.73	21	25	45.7	25	52.2	8.0074	8.387				
	16	0	42.3	137	4	21	2.73	21	5.40	21	26	20.9	26	27.4	8.0087	8.387				
	17	0	38.6	138	4	21	17.43	21	20.11	21	26	56.0	27	2.5	8.0099	8.387				
	18	0	34.9	139	4	21	32.17	21	34.86	21	27	31.0	27	37.5	8.0110	8.387				
	19	0	31.3	140	4	21	46.96	21	49.65	21	28	6.0	28	12.5	8.0121	8.386				
	20	0	27.6	141	4	22	1.78	22	4.47	21	28	41.1	28	47.7	8.0129	8.386				
	21	0	23.9	142	4	22	16.62	22	19.32	21	29	16.2	29	22.8	8.0136	8.386				
	22	0	20.2	143	4	22	31.48	22	34.19	21	29	51.3	29	57.9	8.0141	8.386				
	23	0	16.5	144	4	22	46.36	22	49.07	21	30	26.4	30	33.0	8.0144	8.385				
	24	0	12.9	145	4	23	1.24	23	3.96	21	31	1.5	31	8.0	8.0146	8.385				
	25	0	9.2	146	4	23	16.14	23	18.86	21	31	36.4	31	43.0	8.0149	8.385				
	26	0	5.5	147	4	23	31.06	23	33.78	21	32	11.2	32	17.9	8.0151	8.384				
	27	0	1.8	148	4	23	45.99	23	48.72	21	32	45.9	32	52.7	8.0153	8.384				
	27	23	58.1	149	4	24	0.94	24	3.68	21	33	20.5	33	27.4	8.0155	8.383				
28	23	54.5	150	4	24	15.89	24	18.63	21	33	55.0	34	2.0	8.0157	8.382					
29	23	50.8	151	4	24	30.83	24	33.57	21	34	29.5	34	36.5	8.0157	8.381					
30	23	47.1	152	4	24	45.76	24	48.50	21	35	4.0	35	11.0	8.0156	8.380					
31	23	43.4	153	4	25	0.68	25	3.42	21	35	38.5	35	45.4	8.0154	8.379					
June	1	23	39.7	154	4	25	15.59	25	18.33	21	36	13.0	36	19.7	8.0151	8.377				
	2	23	36.0	155	4	25	30.50	25	33.24	21	36	47.5	36	53.9	8.0148	8.375				
	3	23	32.3	156	4	25	45.39	25	48.13	21	37	21.5	37	28.0	8.0145	8.373				
	4	23	28.6	157	4	26	0.27	26	3.01	21	37	55.4	38	1.9	8.0141	8.371				
	5	23	24.9	158	4	26	15.13	26	17.87	21	38	29.1	38	35.6	8.0136	8.369				
	6	23	21.3	159	4	26	29.98	26	32.72	21	39	2.6	39	9.1	8.0129	8.367				
	7	23	17.6	160	4	26	44.81	26	47.55	21	39	36.0	39	42.5	8.0121	8.366				
	8	23	13.9	161	4	26	59.61	27	2.34	21	40	9.5	40	15.8	8.0113	8.364				
	9	23	10.2	162	4	27	14.38	27	17.11	21	40	42.8	40	49.1	8.0104	8.362				
	10	23	6.5	163	4	27	29.12	27	31.84	21	41	15.9	41	22.1	8.0094	8.360				
	11	23	2.8	164	4	27	43.83	27	46.55	21	41	48.8	41	55.0	8.0083	8.358				-2.14
	12	22	59.1	165	4	27	58.50	28	1.21	21	42	21.5	42	27.7	8.0071	8.356				2.20
	13	22	55.4	166	4	28	13.12	28	15.83	21	42	54.1	43	0.3	8.0059	8.354	-2.08			2.25
	14	22	51.7	167	4	28	27.69	28	30.39	21	43	26.5	43	32.6	8.0046	8.352	2.11			2.30
	15	22	48.0	168	4	28	42.21	28	44.91	21	43	58.6	44	4.7	8.0032	8.349	2.14			2.35
	16	22	44.3	169	4	28	56.68	28	59.37	21	44	30.5	44	36.6	8.0017	8.346	2.16			2.42
	17	22	40.7	170	4	29	11.11	29	13.80	21	45	2.2	45	8.3	8.0000	8.343	2.18			2.48
	18	22	37.0	171	4	29	25.48	29	28.16	21	45	33.9	45	39.9	7.9982	8.340	2.20			2.54
	19	22	33.3	172	4	29	39.78	29	42.45	21	46	5.4	46	11.4	7.9963	8.337	2.22			2.56
	20	22	29.6	173	4	29	54.01	29	56.68	21	46	36.7	46	42.6	7.9943	8.334	2.24			2.61
	21	22	25.9	174	4	30	8.17	30	10.83	21	47	7.8	47	13.6	7.9922	8.331	2.26			2.66
	22	22	22.2	175	4	30	22.29	30	24.93	21	47	38.6	47	44.4	7.9902	8.328	2.27			2.70
	23	22	18.5	176	4	30	36.34	30	38.97	21	48	9.1	48	14.9	7.9880	8.324	2.28			2.73
	24	22	14.8	177	4	30	50.31	30	52.93	21	48	39.4	48	45.1	7.9857	8.320	2.30			2.76
	25	22	11.1	178	4	31	4.20	31	6.80	21	49	9.4	49	15.0	7.9833	8.316	2.31			2.78
	26	22	7.4	179	4	31	18.01	31	20.59	21	49	39.1	49	44.6	7.9808	8.311	2.32			2.79
	27	22	3.7	180	4	31	31.74	31	34.31	21	50	8.5	50	13.9	7.9780	8.306	2.34			2.80
	28	22	0.0	181	4	31	45.41	31	47.96	21	50	37.8	50	43.3	7.9753	8.302	2.35			2.80
	29	21	56.3	182	4	31	58.99	32	1.52	21	51	6.9	51	12.3	7.9725	8.298	2.36			2.81
30	21	52.6	183	4	32	12.48	32	15.00	+21	51	35.6	51	41.0	+7.9696	+8.294	-2.37			-2.81	



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
July	d.	h. m.		h. m. s.	m. s.	° ' "	° ' "				
	1	21 48.9	184	4 32 25.38	32 28.39	+21 52 4.0	52 9.3	+7.9666	+ 8.290	-2.38	-2.82
	2	21 45.2	185	4 32 39.20	32 41.69	21 52 32.1	52 37.4	7.9635	8.286	2.39	2.82
	3	21 41.5	186	4 32 52.41	32 54.88	21 52 59.9	53 5.1	7.9602	8.282	2.40	2.83
	4	21 37.8	187	4 33 5.52	33 7.97	21 53 27.4	53 32.6	7.9568	8.278	2.41	2.83
	5	21 34.1	188	4 33 18.53	33 20.97	21 53 54.7	53 59.8	7.9533	8.274	2.42	2.84
	6	21 30.4	189	4 33 31.44	33 33.86	21 54 21.8	54 26.9	7.9497	8.270	2.43	2.84
	7	21 26.7	190	4 33 44.24	33 46.64	21 54 48.6	54 53.6	7.9461	8.265	2.45	2.85
	8	21 23.0	191	4 33 56.92	33 59.30	21 55 15.1	55 20.1	7.9424	8.260	2.46	2.85
	9	21 19.3	192	4 34 9.49	34 11.85	21 55 41.4	55 46.3	7.9385	8.255	2.47	2.86
	10	21 15.5	193	4 34 21.95	34 24.29	21 56 7.4	56 12.2	7.9344	8.250	2.48	2.86
	11	21 11.8	194	4 34 34.30	34 36.62	21 56 33.0	56 37.9	7.9301	8.245	2.49	2.87
	12	21 8.1	195	4 34 46.53	34 48.83	21 56 58.6	57 3.3	7.9258	8.240	2.50	2.87
	13	21 4.3	196	4 34 58.63	35 0.91	21 57 23.6	57 28.2	7.9214	8.235	2.51	2.87
	14	21 0.6	197	4 35 10.60	35 12.86	21 57 48.3	57 52.8	7.9169	8.230	2.51	2.88
	15	20 56.9	198	4 35 22.45	35 24.69	21 58 12.6	58 17.0	7.9123	8.224	2.52	2.88
	16	20 53.1	199	4 35 34.18	35 36.40	21 58 36.7	58 41.0	7.9076	8.218	2.53	2.88
	17	20 49.4	200	4 35 45.79	35 47.98	21 59 0.4	59 4.7	7.9030	8.212	2.53	2.89
	18	20 45.6	201	4 35 57.27	35 59.44	21 59 23.9	59 28.2	7.8980	8.206	2.54	2.89
	19	20 41.9	202	4 36 8.61	36 10.75	21 59 47.0	59 51.2	7.8928	8.200	2.54	2.89
	20	20 38.1	203	4 36 19.81	36 21.93	22 0 9.9	0 14.0	7.8874	8.193	2.55	2.90
	21	20 34.4	204	4 36 30.87	36 32.96	22 0 32.5	0 36.5	7.8818	8.186	2.55	2.90
	22	20 30.6	205	4 36 41.79	36 43.86	22 0 54.7	0 58.7	7.8762	8.179	2.56	2.90
	23	20 26.9	206	4 36 52.58	36 54.62	22 1 16.6	1 20.5	7.8703	8.172	2.57	2.91
	24	20 23.1	207	4 37 3.21	37 5.23	22 1 38.1	1 41.9	7.8642	8.165	2.57	2.91
	25	20 19.4	208	4 37 13.68	37 15.67	22 1 59.1	2 2.9	7.8579	8.158	2.58	2.92
	26	20 15.6	209	4 37 23.98	37 25.94	22 2 19.8	2 23.6	7.8514	8.151	2.59	2.92
	27	20 11.9	210	4 37 34.13	37 36.06	22 2 40.1	2 43.9	7.8448	8.143	2.60	2.93
	28	20 8.1	211	4 37 44.13	37 46.03	22 3 0.1	3 8.8	7.8378	8.135	2.61	2.93
	29	20 4.3	212	4 37 53.97	37 55.84	22 3 19.7	3 23.3	7.8306	8.127	2.61	2.93
	30	20 0.6	213	4 38 3.65	38 5.49	22 3 39.1	3 42.6	7.8239	8.118	2.62	2.94
	31	19 56.8	214	4 38 13.17	38 14.98	22 3 58.2	4 1.7	7.8169	8.109	2.62	2.94
Aug.	1	19 53.0	215	4 38 22.54	38 24.31	22 4 17.1	4 20.5	7.8094	8.100	2.63	2.94
	2	19 49.3	216	4 38 31.74	38 33.48	22 4 35.5	4 38.8	7.8014	8.091	2.63	2.95
	3	19 45.5	217	4 38 40.77	38 42.48	22 4 53.6	4 56.9	7.7930	8.082	2.64	2.95
	4	19 41.7	218	4 38 49.62	38 51.30	22 5 11.3	5 14.5	7.7841	8.073	2.64	2.95
	5	19 37.9	219	4 38 58.29	38 59.94	22 5 28.5	5 31.6	7.7753	8.064	2.65	2.96
	6	19 34.1	220	4 39 6.79	39 8.40	22 5 45.3	5 48.4	7.7664	8.054	2.65	2.96
	7	19 30.3	221	4 39 15.11	39 16.68	22 6 1.7	6 4.7	7.7572	8.044	2.65	2.96
	8	19 26.5	222	4 39 23.26	39 24.79	22 6 17.8	6 20.7	7.7482	8.034	2.66	2.96
	9	19 22.7	223	4 39 31.24	39 32.74	22 6 33.5	6 36.3	7.7390	8.023	2.66	2.97
	10	19 18.9	224	4 39 39.05	39 40.51	22 6 48.7	6 51.5	7.7289	8.012	2.67	2.97
	11	19 15.1	225	4 39 46.67	39 48.09	22 7 3.5	7 6.3	7.7181	8.001	2.67	2.97
	12	19 11.3	226	4 39 54.10	39 55.49	22 7 18.0	7 20.7	7.7068	7.990	2.67	2.98
	13	19 7.5	227	4 40 1.83	40 2.68	22 7 32.2	7 34.8	7.6947	7.979	2.68	2.98
	14	19 3.7	228	4 40 8.36	40 9.67	22 7 46.0	7 48.5	7.6824	7.967	2.68	2.98
	15	18 59.9	229	4 40 15.19	40 16.46	22 7 59.4	8 1.9	7.6700	7.955	2.69	2.98
	16	18 56.0	230	4 40 21.83	40 23.07	22 8 12.5	8 14.9	7.6573	7.942	2.69	2.99
	17	18 52.2	231	4 40 28.27	40 29.47	22 8 25.2	8 27.5	7.6441	7.929	2.70	2.99
	18	18 48.4	232	4 40 34.52	40 35.68	22 8 37.5	8 39.7	7.6308	7.915	2.70	2.99
	19	18 44.6	233	4 40 40.58	40 41.70	22 8 49.3	8 51.4	7.6172	7.900	2.70	2.99
	20	18 40.6	234	4 40 46.45	40 47.53	22 9 0.7	9 2.7	7.6024	7.884	2.71	2.99
	21	18 36.8	235	4 40 52.11	40 53.16	22 9 11.7	9 13.7	7.5867	7.868	2.71	2.99
	22	18 32.9	236	4 40 57.57	40 58.58	22 9 22.3	9 24.2	7.5708	7.852	2.71	2.99
	23	18 29.1	237	4 41 2.83	41 3.80	22 9 32.5	9 34.3	7.5542	7.835	2.72	2.99
	24	18 25.3	238	4 41 7.89	41 8.83	22 9 42.3	9 44.0	7.5371	7.818	2.72	2.99
	25	18 21.5	239	4 41 12.75	41 13.65	22 9 51.8	9 53.4	7.5183	7.800	2.72	3.00
	26	18 17.6	240	4 41 17.39	41 18.25	22 10 1.0	10 2.5	7.4982	7.781	2.72	3.00
	27	18 13.8	241	4 41 21.82	41 22.63	22 10 9.7	10 11.2	7.4776	7.761	2.73	3.00
	28	18 9.9	242	4 41 26.04	41 26.81	22 10 17.9	10 19.4	7.4560	7.739	2.73	3.00
	29	18 6.0	243	4 41 30.05	41 30.78	22 10 25.8	10 27.2	7.4333	7.714	2.73	3.00
	30	18 2.2	244	4 41 33.85	41 34.54	22 10 33.2	10 34.6	7.4081	7.689	2.73	3.00
	31	17 58.3	245	4 41 37.42	41 38.08	+22 10 40.3	10 41.6	+7.3813	+ 7.661	-2.73	-3.00



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.		h. m. s.	m. s.	° ' "	° ' "				
Sept. 1 17 54.4	246	4 41 40.78	41 41.39	+22 10 46.9	10 48.1	+7.3535	+ 7.632	-2.73	-2.99
2 17 50.5	247	4 41 43.92	41 44.48	22 10 53.2	10 54.3	7.3231	7.601	2.73	2.99
3 17 46.7	248	4 41 46.84	41 47.35	22 10 59.0	11 0.0	7.2903	7.568	2.73	2.99
4 17 42.8	249	4 41 49.54	41 50.00	22 11 4.5	11 5.4	7.2532	7.533	2.73	2.99
5 17 38.9	250	4 41 52.00	41 52.43	22 11 9.5	11 10.4	7.2136	7.495	2.73	2.99
6 17 35.0	251	4 41 54.25	41 54.64	22 11 14.0	11 14.8	7.1731	7.453	2.73	2.99
7 17 31.1	252	4 41 56.29	41 56.64	22 11 18.1	11 18.8	7.1283	7.407	2.73	2.99
8 17 27.2	253	4 41 58.12	41 58.43	22 11 21.9	11 22.5	7.0784	7.356	2.73	2.98
9 17 23.3	254	4 41 59.74	42 0.01	22 11 25.2	11 25.8	7.0220	7.300	2.73	2.98
10 17 19.4	255	4 42 1.15	42 1.37	22 11 28.1	11 28.6	6.9539	7.239	2.73	2.98
11 17 15.5	256	4 42 2.33	42 2.51	22 11 30.6	11 31.0	6.8710	7.159	2.72	2.98
12 17 11.6	257	4 42 3.29	42 3.43	22 11 32.7	11 33.0	6.7710	7.049	2.72	2.98
13 17 7.7	258	4 42 4.03	42 4.13	22 11 34.4	11 34.6	6.6410	6.909	2.72	2.98
14 17 3.8	259	4 42 4.55	42 4.61	22 11 35.8	11 35.9	6.4649	6.739	2.72	2.97
15 16 59.8	260	4 42 4.87	42 4.89	22 11 36.7	11 36.8	+6.1638	6.540	2.72	2.97
16 16 55.9	261	4 42 4.97	42 4.96	22 11 37.3	11 37.3	-4.8416	+ 5.985	2.72	2.97
17 16 51.9	262	4 42 4.85	42 4.80	22 11 37.3	11 37.3	6.2034	- 5.985	2.71	2.97
18 16 48.0	263	4 42 4.51	42 4.42	22 11 36.9	11 36.8	6.4948	6.484	2.71	2.97
19 16 44.0	264	4 42 3.95	42 3.81	22 11 36.2	11 36.0	6.6741	6.742	2.71	2.97
20 16 40.1	265	4 42 3.15	42 2.98	22 11 35.2	11 34.9	6.8007	6.988	2.71	2.97
21 16 36.1	266	4 42 2.13	42 1.92	22 11 33.8	11 33.7	6.8928	7.072	2.71	2.97
22 16 32.2	267	4 42 0.90	42 0.65	22 11 32.0	11 31.5	6.9687	7.184	2.71	2.97
23 16 28.2	268	4 41 59.45	41 59.16	22 11 29.7	11 29.1	7.0338	7.256	2.71	2.96
24 16 24.3	269	4 41 57.78	41 57.42	22 11 27.0	11 26.3	7.0908	7.333	2.71	2.96
25 16 20.3	270	4 41 55.90	41 55.48	22 11 23.7	11 23.0	7.1405	7.386	2.71	2.96
26 16 16.4	271	4 41 53.80	41 53.32	22 11 20.1	11 19.4	7.1841	7.427	2.70	2.96
27 16 12.4	272	4 41 51.50	41 50.98	22 11 16.2	11 15.4	7.2236	7.466	2.70	2.96
28 16 8.4	273	4 41 48.98	41 48.43	22 11 11.9	11 11.0	7.2599	7.503	2.70	2.96
29 16 4.4	274	4 41 46.26	41 45.67	22 11 7.2	11 6.2	7.2949	7.538	2.70	2.96
30 16 0.4	275	4 41 43.30	41 42.68	22 11 2.0	11 0.9	7.3281	7.572	2.70	2.96
Oct. 1 15 56.5	276	4 41 40.13	41 39.47	22 10 56.5	10 55.3	7.3575	7.603	2.70	2.95
2 15 52.5	277	4 41 36.74	41 36.05	22 10 50.6	10 49.4	7.3838	7.632	2.69	2.95
3 15 48.5	278	4 41 33.16	41 32.43	22 10 44.3	10 43.0	7.4075	7.659	2.69	2.95
4 15 44.5	279	4 41 29.38	41 28.61	22 10 37.6	10 36.2	7.4310	7.684	2.69	2.95
5 15 40.5	280	4 41 25.39	41 24.58	22 10 30.5	10 29.1	7.4544	7.706	2.69	2.95
6 15 36.4	281	4 41 21.18	41 20.33	22 10 23.0	10 21.5	7.4761	7.726	2.68	2.95
7 15 32.4	282	4 41 16.77	41 15.88	22 10 15.2	10 23.6	7.4953	7.747	2.68	2.95
8 15 28.4	283	4 41 12.17	41 11.24	22 10 7.0	10 5.3	7.5133	7.767	2.68	2.95
9 15 24.4	284	4 41 7.38	41 6.41	22 9 58.4	9 56.7	7.5309	7.787	2.67	2.94
10 15 20.4	285	4 41 2.39	41 1.38	22 9 49.3	9 47.5	7.5489	7.806	2.67	2.94
11 15 16.3	286	4 40 57.18	40 56.14	22 9 39.9	9 38.0	7.5663	7.823	2.66	2.94
12 15 12.3	287	4 40 51.78	40 50.70	22 9 30.2	9 28.3	7.5816	7.839	2.66	2.94
13 15 8.3	288	4 40 46.20	40 45.08	22 9 20.1	9 18.1	7.5952	7.854	2.65	2.94
14 15 4.3	289	4 40 40.44	40 39.28	22 9 9.6	9 7.6	7.6084	7.868	2.65	2.93
15 15 6.3	290	4 40 34.51	40 33.31	22 8 58.7	8 56.6	7.6222	7.883	2.64	2.93
16 14 56.3	291	4 40 28.37	40 27.14	22 8 47.5	8 45.3	7.6356	7.897	2.64	2.93
17 14 52.2	292	4 40 22.05	40 20.79	22 8 35.9	8 33.7	7.6481	7.911	2.63	2.93
18 14 48.2	293	4 40 15.56	40 14.27	22 8 23.9	8 21.6	7.6595	7.924	2.62	2.92
19 14 44.1	294	4 40 8.90	40 7.58	22 8 11.6	8 9.2	7.6717	7.936	2.61	2.92
20 14 40.1	295	4 40 2.04	40 0.69	22 7 58.9	7 56.5	7.6835	7.949	2.61	2.92
21 14 36.0	296	4 39 55.00	39 53.62	22 7 45.9	7 43.4	7.6941	7.961	2.59	2.92
22 14 32.0	297	4 39 47.80	39 46.39	22 7 32.6	7 30.0	7.7038	7.972	2.59	2.91
23 14 27.9	298	4 39 40.45	39 39.01	22 7 19.0	7 16.4	7.7127	7.982	2.58	2.91
24 14 23.9	299	4 39 32.94	39 31.47	22 7 5.1	7 2.4	7.7215	7.991	2.58	2.91
25 14 19.8	300	4 39 25.28	39 23.78	22 6 50.8	6 48.1	7.7303	8.000	2.57	2.90
26 14 15.8	301	4 39 17.46	39 15.93	22 6 36.2	6 33.4	7.7387	8.010	2.56	2.90
27 14 11.7	302	4 39 9.48	39 7.93	22 6 21.3	6 18.5	7.7474	8.019	2.55	2.90
28 14 7.6	303	4 39 1.36	38 59.78	22 6 6.1	6 3.2	7.7549	8.028	2.54	2.89
29 14 3.6	304	4 38 53.10	38 51.49	22 5 50.6	5 47.7	7.7628	8.037	2.53	2.88
30 13 59.5	305	4 38 44.68	38 43.04	22 5 34.7	5 31.7	7.7705	8.046	2.52	2.87
31 13 55.4	306	4 38 36.12	38 34.46	22 5 18.5	5 15.4	7.7776	8.054	2.51	2.86
32 13 51.4	307	4 38 27.42	38 25.73	+22 5 2.0	4 58.9	-7.7841	- 8.062	-2.50	-2.85



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.		h. m. s.	m. s.	° ' "	° ' "				
Nov. 1 13 51.4	307	4 36 27.42	38 25.73	+22 5 2.0	4 58.9	-7.7849	- 8.062	-2.50	-2.85
2 13 47.3	308	4 38 18.60	38 16.88	22 4 45.2	4 42.0	7.7913	8.070	2.49	2.85
3 13 43.2	309	4 38 9.66	38 7.92	22 4 28.1	4 24.9	7.7975	8.078	2.48	2.84
4 13 39.1	310	4 38 0.61	37 58.84	22 4 10.8	4 7.5	7.8035	8.085	2.47	2.83
5 13 35.1	311	4 37 51.43	37 49.64	22 3 53.1	3 49.7	7.8095	8.092	2.46	2.82
6 13 31.0	312	4 37 42.12	37 40.31	22 3 35.1	3 31.7	7.8149	8.098	2.45	2.81
7 13 26.9	313	4 37 32.70	37 30.87	22 3 16.9	3 13.4	7.8200	8.104	2.44	2.80
8 13 22.8	314	4 37 23.16	37 21.32	22 2 58.5	2 55.0	7.8248	8.110	2.43	2.79
9 13 18.7	315	4 37 13.50	37 11.64	22 2 39.8	2 36.3	7.8292	8.116	2.42	2.78
10 13 14.6	316	4 37 3.74	37 1.86	22 2 20.9	2 17.3	7.8334	8.121	2.41	2.77
11 13 10.5	317	4 36 53.90	36 52.00	22 2 1.9	1 58.3	7.8374	8.126	2.39	2.75
12 13 6.4	318	4 36 43.98	36 42.06	22 1 42.9	1 39.1	7.8412	8.131	2.38	2.74
13 13 2.3	319	4 36 33.98	36 32.04	22 1 23.3	1 19.6	7.8448	8.135	2.36	2.73
14 12 58.2	320	4 36 23.88	36 21.93	22 1 3.6	0 59.9	7.8480	8.139	2.34	2.72
15 12 54.1	321	4 36 13.69	36 11.73	22 0 43.8	0 40.1	7.8516	8.143	2.31	2.70
16 12 50.0	322	4 36 3.42	36 1.45	22 0 23.8	0 20.0	7.8545	8.147	2.27	2.68
17 12 45.9	323	4 35 53.09	35 51.11	22 0 3.7	59 59.9	7.8571	8.150	2.23	2.65
18 12 41.8	324	4 35 42.71	35 40.72	21 59 43.4	59 39.6	7.8594	8.153	2.18	2.62
19 12 37.7	325	4 35 32.28	35 30.28	21 59 22.9	59 19.1	7.8615	8.156	2.13	2.59
20 12 33.5	326	4 35 21.79	35 19.78	21 59 2.2	58 58.3	7.8634	8.158	-2.07	2.56
21 12 29.4	327	4 35 11.24	35 9.22	21 58 41.4	58 37.6	7.8652	8.161		2.52
22 12 25.3	328	4 35 0.64	34 58.61	21 58 20.5	58 16.7	7.8669	8.163		2.48
23 12 21.2	329	4 34 49.99	34 47.95	21 57 59.5	57 55.7	7.8685	8.165		2.45
24 12 17.0	330	4 34 39.31	34 37.26	21 57 38.6	57 34.7	7.8700	8.167		2.41
25 12 12.9	331	4 34 28.59	34 26.54	21 57 17.5	57 13.6	7.8713	8.169		-2.38
26 12 8.8	332	4 34 17.85	34 15.80	21 56 56.2	56 52.3	7.8724	8.171		
27 12 4.7	333	4 34 7.09	34 5.04	21 56 34.8	56 30.9	7.8733	8.173		
28 12 0.6	334	4 33 56.31	33 54.26	21 56 13.3	56 9.3	7.8740	8.174		
29 11 56.5	335	4 33 45.52	33 43.47	21 55 51.6	55 47.6	7.8746	8.175		
30 11 52.4	336	4 33 34.72	33 32.67	21 55 29.9	55 25.9	7.8750	8.176		
Dec. 1 11 48.3	337	4 33 23.92	33 21.87	21 55 8.2	55 4.2	7.8751	8.177		
2 11 44.2	338	4 33 13.12	33 11.07	21 54 46.4	54 42.4	7.8750	8.179		
3 11 40.1	339	4 33 2.32	33 0.27	21 54 24.5	54 20.5	7.8748	8.180		
4 11 35.9	340	4 32 51.51	32 49.47	21 54 2.5	53 58.5	7.8746	8.182		
5 11 31.8	341	4 32 40.72	32 38.69	21 53 40.6	53 36.6	7.8740	8.182		
6 11 27.7	342	4 32 29.96	32 27.94	21 53 18.7	53 14.7	7.8731	8.183		
7 11 23.6	343	4 32 19.23	32 17.22	21 52 56.8	52 52.8	7.8719	8.183		
8 11 19.5	344	4 32 8.53	32 6.53	21 52 34.8	52 30.8	7.8704	8.183		
9 11 15.4	345	4 31 57.87	31 55.88	21 52 12.8	52 8.9	7.8684	8.182		
10 11 11.3	346	4 31 47.25	31 45.27	21 51 51.0	51 47.1	7.8664	8.181		
11 11 7.2	347	4 31 36.67	31 34.70	21 51 29.3	51 25.4	7.8642	8.180	+2.05	
12 11 3.1	348	4 31 26.14	31 24.18	21 51 7.7	51 3.8	7.8618	8.178	2.11	
13 10 59.0	349	4 31 15.66	31 13.71	21 50 46.1	50 42.2	7.8592	8.175	2.16	
14 10 54.8	350	4 31 5.23	31 3.29	21 50 24.6	50 20.7	7.8564	8.172	2.20	
15 10 50.7	351	4 30 54.87	30 52.94	21 50 3.3	49 59.5	7.8535	8.170	2.24	
16 10 46.6	352	4 30 44.59	30 42.67	21 49 42.1	49 38.3	7.8505	8.167	2.27	
17 10 42.5	353	4 30 34.38	30 32.47	21 49 21.0	49 17.2	7.8477	8.165	2.30	
18 10 38.4	354	4 30 24.24	30 22.35	21 49 0.0	48 56.2	7.8443	8.163	2.33	
19 10 34.3	355	4 30 14.17	30 12.30	21 48 39.2	48 35.4	7.8400	8.160	2.35	
20 10 30.2	356	4 30 4.19	30 2.34	21 48 18.5	48 14.7	7.8360	8.157	2.38	+2.38
21 10 26.1	357	4 29 54.31	29 52.48	21 47 58.0	47 54.3	7.8319	8.155	2.40	2.40
22 10 22.0	358	4 29 44.53	29 42.72	21 47 37.6	47 33.9	7.8277	8.152	2.42	2.44
23 10 17.9	359	4 29 34.85	29 33.06	21 47 17.3	47 13.6	7.8234	8.149	2.44	2.47
24 10 13.8	360	4 29 25.28	29 23.51	21 46 57.0	46 53.3	7.8188	8.147	2.46	2.50
25 10 9.7	361	4 29 15.82	29 14.07	21 46 36.9	46 33.2	7.8140	8.144	2.47	2.54
26 10 5.6	362	4 29 6.48	29 4.76	21 46 16.9	46 13.2	7.8090	8.140	2.48	2.57
27 10 1.5	363	4 28 57.26	28 55.56	21 45 57.1	45 53.4	7.8038	8.136	2.49	2.60
28 9 57.4	364	4 28 48.16	28 46.49	21 45 37.4	45 33.8	7.7984	8.131	2.50	2.62
29 9 53.3	365	4 28 39.18	28 37.53	21 45 18.0	45 14.5	7.7928	8.126	2.51	2.65
30 9 49.2	366	4 28 30.32	28 28.70	21 44 58.8	44 55.3	7.7870	8.121	2.52	2.67
31 9 45.1	367	4 28 21.57	28 19.97	+21 44 39.8	44 36.4	-7.7810	- 8.116	+2.53	+2.69



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .									
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.								
d.	h.	m.		h.	m.	s.	m.	s.	°	'	"								
Jan.	0	5	2.8	0	23	42	2.76	42	2.72	-	3	20	3.9	20	4.1	+7.3445	+ 8.202	+2.48	+3.97
	1	4	59.0	1	23	42	6.00	42	5.95		3	19	40.6	19	40.8	7.3604	8.216	2.48	3.27
	2	4	55.1	2	23	42	9.36	42	9.31		3	19	16.6	19	16.9	7.3754	8.229	2.47	3.26
	3	4	51.2	3	23	42	12.83	42	12.78		3	18	51.8	18	52.2	7.3900	8.242	2.47	3.26
	4	4	47.3	4	23	42	16.42	42	16.37		3	18	26.3	18	26.6	7.4041	8.254	2.47	3.26
	5	4	43.5	5	23	42	20.13	42	20.08		3	18	0.1	18	0.4	7.4177	8.266	2.46	3.26
	6	4	39.6	6	23	42	23.95	42	23.90		3	17	33.2	17	33.5	7.4308	8.278	2.46	3.25
	7	4	35.7	7	23	42	27.89	42	27.84		3	17	5.5	17	5.8	7.4434	8.289	2.46	3.25
	8	4	31.9	8	23	42	31.94	42	31.89		3	16	37.1	16	37.4	7.4555	8.300	2.45	3.25
	9	4	28.0	9	23	42	36.11	42	36.06		3	16	8.0	16	8.3	7.4673	8.311	2.45	3.24
	10	4	24.1	10	23	42	40.39	42	40.33		3	15	38.2	15	38.6	7.4785	8.322	2.44	3.24
	11	4	20.3	11	23	42	44.78	42	44.72		3	15	7.7	15	8.1	7.4897	8.332	2.44	3.23
	12	4	16.4	12	23	42	49.28	42	49.22		3	14	36.4	14	36.8	7.5004	8.342	2.43	3.23
	13	4	12.6	13	23	42	53.89	42	53.83		3	14	4.5	14	4.9	7.5107	8.351	2.43	3.22
	14	4	8.7	14	23	42	58.61	42	58.55		3	13	31.9	13	32.3	7.5206	8.360	2.42	3.22
	15	4	4.9	15	23	43	8.43	43	8.37		3	12	58.6	12	59.0	7.5302	8.368	2.42	3.21
	16	4	1.0	16	23	43	8.36	43	8.30		3	12	24.7	12	25.1	7.5393	8.376	2.41	3.21
	17	3	57.2	17	23	43	13.40	43	13.34		3	11	50.1	11	50.5	7.5482	8.384	2.41	3.20
	18	3	53.3	18	23	43	18.54	43	18.48		3	11	14.9	11	15.3	7.5568	8.392	2.40	3.20
	19	3	49.5	19	23	43	23.78	43	23.72		3	10	39.1	10	39.5	7.5651	8.400	2.40	3.19
	20	3	45.6	20	23	43	29.12	43	29.06		3	10	2.7	10	3.1	7.5732	8.407	2.39	3.18
	21	3	41.8	21	23	43	34.56	43	34.50		3	9	25.6	9	26.0	7.5810	8.414	2.38	3.17
	22	3	37.9	22	23	43	40.10	43	40.04		3	8	47.9	8	48.3	7.5886	8.421	2.38	3.17
	23	3	34.1	23	23	43	45.74	43	45.68		3	8	9.7	8	10.1	7.5960	8.427	2.37	3.16
	24	3	30.2	24	23	43	51.47	43	51.41		3	7	30.9	7	31.3	7.6033	8.434	2.36	3.15
	25	3	26.4	25	23	43	57.29	43	57.23		3	6	51.5	6	51.9	7.6103	8.440	2.35	3.14
	26	3	22.5	26	23	44	3.21	44	3.14		3	6	11.5	6	12.0	7.6171	8.446	2.35	3.14
	27	3	18.7	27	23	44	9.21	44	9.14		3	5	31.0	5	31.5	7.6237	8.452	2.34	3.13
	28	3	14.9	28	23	44	15.30	44	15.23		3	4	50.0	4	50.5	7.6299	8.458	2.33	3.12
	29	3	11.1	29	23	44	21.48	44	21.41		3	4	8.4	4	8.9	7.6361	8.463	2.32	3.11
	30	3	7.2	30	23	44	27.75	44	27.68		3	3	26.3	3	26.8	7.6420	8.469	2.32	3.10
	31	3	3.4	31	23	44	34.10	44	34.03		3	2	43.7	2	44.2	7.6476	8.474	2.31	3.09
Feb.	1	2	59.6	32	23	44	40.53	44	40.46		3	2	0.5	2	1.0	7.6530	8.479	2.30	3.08
	2	2	55.7	33	23	44	47.04	44	46.97		3	1	16.9	1	17.4	7.6582	8.484	2.29	3.07
	3	2	51.9	34	23	44	53.63	44	53.56		3	0	32.8	0	33.3	7.6633	8.489	2.28	3.06
	4	2	48.1	35	23	45	0.30	45	0.23		2	59	48.2	59	48.7	7.6682	8.494	2.27	3.05
	5	2	44.3	36	23	45	7.04	45	6.97		2	59	3.1	59	3.6	7.6730	8.498	2.26	3.04
	6	2	40.5	37	23	45	13.86	45	13.79		2	58	17.6	58	18.1	7.6776	8.502	2.25	3.03
	7	2	36.6	38	23	45	20.75	45	20.68		2	57	31.7	57	32.2	7.6821	8.506	2.24	3.02
	8	2	32.8	39	23	45	27.71	45	27.64		2	56	45.3	56	45.8	7.6865	8.510	2.23	3.01
	9	2	29.0	40	23	45	34.74	45	34.67		2	55	58.5	55	59.0	7.6908	8.514	2.22	3.00
	10	2	25.2	41	23	45	41.84	45	41.77		2	55	11.3	55	11.8	7.6950	8.517	2.21	2.98
	11	2	21.4	42	23	45	49.01	45	48.94		2	54	23.7	54	24.2	7.6990	8.521	2.20	2.97
	12	2	17.6	43	23	45	56.24	45	56.17		2	53	35.7	53	36.2	7.7029	8.524	2.19	2.96
	13	2	13.8	44	23	46	3.53	46	3.46		2	52	47.4	52	47.9	7.7066	8.528	2.18	2.95
	14	2	10.0	45	23	46	10.89	46	10.82		2	51	58.7	51	59.2	7.7101	8.531	2.16	2.93
	15	2	6.2	46	23	46	18.31	46	18.24		2	51	9.7	51	10.2	7.7135	8.534	2.15	2.92
	16	2	2.4	47	23	46	25.78	46	25.71		2	50	20.3	50	20.8	7.7167	8.537	2.14	2.90
	17	1	58.6	48	23	46	33.31	46	33.24		2	49	30.6	49	31.1	7.7198	8.540	2.13	2.88
	18	1	54.8	49	23	46	40.89	46	40.82		2	48	40.5	48	41.0	7.7228	8.543	2.11	2.86
	19	1	51.0	50	23	46	48.52	46	48.45		2	47	50.1	47	50.5	7.7257	8.545	2.10	2.84
	20	1	47.2	51	23	46	56.21	46	56.14		2	46	59.5	46	59.9	7.7286	8.547	2.08	2.82
	21	1	43.4	52	23	47	3.95	47	3.88		2	46	8.6	46	9.0	7.7313	8.549	2.07	2.80
	22	1	39.6	53	23	47	11.73	47	11.66		2	45	17.5	45	17.9	7.7340	8.551	2.05	2.78
	23	1	35.8	54	23	47	19.56	47	19.49		2	44	26.1	44	26.5	7.7366	8.553	2.04	2.76
	24	1	32.0	55	23	47	27.43	47	27.36		2	43	34.5	43	34.9	7.7390	8.555	2.02	2.73
	25	1	28.2	56	23	47	35.35	47	35.28		2	42	42.6	42	43.0	7.7412	8.557	2.00	+2.70
	26	1	24.4	57	23	47	43.30	47	43.23		2	41	50.5	41	50.9	7.7434	8.559	1.98	
	27	1	20.6	58	23	47	51.29	47	51.22		2	40	58.2	40	58.6	7.7455	8.561	1.96	
	28	1	16.8	59	23	47	59.32	47	59.25		2	40	5.7	40	6.1	7.7474	8.563	1.93	
	29	1	13.0	60	23	48	7.38	48	7.31		2	39	13.0	39	13.4	7.7492	8.565	1.90	
	30	1	9.2	61	23	48	15.48	48	15.41	-	2	38	20.2	38	20.6	+7.7509	+ 8.566	+1.86	



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Data.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
Mar. d. h. m.		h. m. s.	m. s.	° ' "	° ' "				
1 1 9.2	61	23 48 15.48	48 15.41	2 38 20.2	38 20.6	+7.7509	+ 8.566	+1.86	
2 1 5.4	62	23 48 23.61	48 23.54	2 37 27.2	37 27.6	7.7524	8.567	+1.82	
3 1 1.6	63	23 48 31.76	48 31.69	2 36 34.1	36 34.5	7.7539	8.568		
4 0 57.8	64	23 48 39.94	48 39.87	2 35 40.8	35 41.2	7.7553	8.569		
5 0 54.0	65	23 48 48.14	48 48.07	2 34 47.5	34 47.9	7.7565	8.570		
6 0 50.2	66	23 48 56.37	48 56.30	2 33 54.1	33 54.5	7.7576	8.571		
7 0 46.4	67	23 49 4.62	49 4.55	2 33 0.6	33 1.0	7.7586	8.571		
8 0 42.6	68	23 49 12.89	49 12.82	2 32 7.0	32 7.4	7.7595	8.572		
9 0 38.8	69	23 49 21.17	49 21.10	2 31 13.3	31 13.7	7.7603	8.572		
10 0 35.0	70	23 49 29.47	49 29.40	2 30 19.6	30 20.0	7.7611	8.573		
11 0 31.2	71	23 49 37.78	49 37.71	2 29 25.8	29 26.2	7.7618	8.573		
12 0 27.4	72	23 49 46.10	49 46.03	2 28 32.0	28 32.4	7.7623	8.573		
13 0 23.6	73	23 49 54.43	49 54.37	2 27 38.1	27 38.5	7.7628	8.573		
14 0 19.8	74	23 50 2.76	50 2.70	2 26 44.2	26 44.5	7.7630	8.573		
15 0 16.0	75	23 50 11.10	50 11.04	2 25 50.3	25 50.6	7.7631	8.573		
16 0 12.2	76	23 50 19.44	50 19.38	2 24 56.4	24 56.7	7.7630	8.573		
17 0 8.5	77	23 50 27.79	50 27.73	2 24 2.6	24 2.9	7.7628	8.573		
18 0 4.7	78	23 50 36.13	50 36.07	2 23 8.8	23 9.1	7.7627	8.573		
19 0 0.9	79	23 50 44.47	50 44.41	2 22 15.0	22 15.3	7.7625	8.573		
19 23 57.1	80	23 50 52.81	50 52.75	2 21 21.3	21 21.6	7.7623	8.572		
20 23 53.3	81	23 51 1.14	51 1.08	2 20 27.7	20 28.0	7.7621	8.571		
21 28 49.5	82	23 51 9.47	51 9.41	2 19 34.2	19 34.5	7.7618	8.570		
22 23 45.7	83	23 51 17.80	51 17.75	2 18 40.8	18 41.1	7.7614	8.569		
23 23 41.9	84	23 51 26.11	51 26.06	2 17 47.6	17 47.9	7.7610	8.568		
24 23 38.1	85	23 51 34.41	51 34.36	2 16 54.5	16 54.8	7.7602	8.567		
25 23 34.3	86	23 51 42.69	51 42.64	2 16 1.5	16 1.8	7.7593	8.566		
26 23 30.6	87	23 51 50.95	51 50.90	2 15 8.7	15 9.0	7.7583	8.565		
27 23 26.8	88	23 51 59.20	51 59.15	2 14 16.0	14 16.3	7.7572	8.563		
28 23 23.0	89	23 52 7.43	52 7.38	2 13 23.5	13 23.8	7.7560	8.562		
29 23 19.2	90	23 52 15.63	52 15.58	2 12 31.1	12 31.4	7.7548	8.560		
30 23 15.4	91	23 52 23.81	52 23.77	2 11 38.9	11 39.2	7.7536	8.558		-2.69
31 23 11.6	92	23 52 31.97	52 31.93	2 10 47.0	10 47.3	7.7522	8.556	-1.78	2.73
Apr. 1 23 7.8	93	23 52 40.10	52 40.06	2 9 55.3	9 55.6	7.7507	8.554	1.82	2.76
2 23 4.0	94	23 52 48.19	52 48.15	2 9 3.8	9 4.1	7.7492	8.552	1.85	2.78
3 23 0.2	95	23 52 56.26	52 56.22	2 8 12.5	8 12.8	7.7475	8.550	1.88	2.80
4 23 56.4	96	23 53 4.29	53 4.25	2 7 21.5	7 21.8	7.7458	8.548	1.91	2.82
5 23 52.6	97	23 53 12.29	53 12.25	2 6 30.8	6 31.1	7.7439	8.546	1.94	2.84
6 23 48.8	98	23 53 20.26	53 20.22	2 5 40.3	5 40.6	7.7420	8.543	1.96	2.85
7 23 45.0	99	23 53 28.19	53 28.16	2 4 50.1	4 50.3	7.7400	8.541	1.99	2.87
8 23 41.2	100	23 53 36.08	53 36.05	2 4 0.2	4 0.4	7.7378	8.538	2.01	2.88
9 23 37.4	101	23 53 43.93	53 43.90	2 3 10.7	3 10.9	7.7355	8.536	2.03	2.90
10 23 33.6	102	23 53 51.74	53 51.71	2 2 21.5	2 21.7	7.7331	8.533	2.05	2.91
11 23 29.8	103	23 53 59.51	53 59.48	2 1 32.6	1 32.8	7.7307	8.530	2.07	2.93
12 23 26.0	104	23 54 7.23	54 7.20	2 0 44.0	0 44.2	7.7281	8.527	2.08	2.94
13 23 22.2	105	23 54 14.91	54 14.88	1 59 55.8	59 56.0	7.7253	8.524	2.09	2.95
14 23 18.4	106	23 54 22.53	54 22.50	1 59 7.9	59 8.1	7.7224	8.520	2.10	2.96
15 23 14.6	107	23 54 30.10	54 30.08	1 58 20.4	58 20.6	7.7193	8.517	2.12	2.98
16 23 10.8	108	23 54 37.62	54 37.60	1 57 33.3	57 33.5	7.7162	8.513	2.13	2.99
17 23 7.0	109	23 54 45.08	54 45.06	1 56 46.6	56 46.8	7.7130	8.509	2.14	3.00
18 23 3.1	110	23 54 52.49	54 52.47	1 56 0.3	56 0.5	7.7097	8.505	2.15	3.01
19 21 59.3	111	23 54 59.84	54 59.82	1 55 14.4	55 14.6	7.7062	8.501	2.16	3.02
20 21 55.5	112	23 55 7.13	55 7.11	1 54 28.9	54 29.1	7.7026	8.497	2.17	3.03
21 21 51.7	113	23 55 14.36	55 14.34	1 53 43.8	53 44.0	7.6988	8.493	2.18	3.04
22 21 47.9	114	23 55 21.52	55 21.50	1 52 59.2	52 59.4	7.6949	8.489	2.19	3.05
23 21 44.1	115	23 55 28.62	55 28.60	1 52 15.0	52 15.2	7.6910	8.485	2.20	3.06
24 21 40.3	116	23 55 35.65	55 35.63	1 51 31.3	51 31.5	7.6870	8.480	2.21	3.07
25 21 36.5	117	23 55 42.62	55 42.60	1 50 48.1	50 48.3	7.6827	8.475	2.22	3.08
26 21 32.6	118	23 55 49.52	55 49.50	1 50 5.4	50 5.6	7.6783	8.470	2.23	3.08
27 21 28.8	119	23 55 56.35	55 56.33	1 49 23.2	49 23.4	7.6739	8.465	2.24	3.09
28 21 25.0	120	23 56 3.11	56 3.09	1 48 41.5	48 41.7	7.6693	8.460	2.25	3.10
29 21 21.2	121	23 56 9.80	56 9.78	1 48 0.2	48 0.4	7.6644	8.455	2.26	3.10
30 21 17.3	122	23 56 16.41	56 16.39	1 47 19.5	47 19.7	+7.6595	+ 8.449	-2.27	-3.11



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
May	d. h. m.	h. m. s.	m. s.	° ' "	° ' "				
1 21 13.5	123	23 56 22.95	56 22.94	1 46 39.3	46 39.4	+7.6546	+ 8.443	-2.28	-3.11
2 21 9.7	124	23 56 29.41	56 29.40	1 45 59.6	45 59.7	7.6495	8.437	2.29	3.12
3 21 5.9	125	23 56 35.79	56 35.78	1 45 20.5	45 20.6	7.6442	8.431	2.30	3.12
4 21 2.0	126	23 56 42.10	56 42.09	1 44 41.9	44 42.0	7.6387	8.425	2.30	3.13
5 20 58.2	127	23 56 48.33	56 48.32	1 44 3.9	44 4.0	7.6331	8.419	2.31	3.14
6 20 54.4	128	23 56 54.47	56 54.46	1 43 26.5	43 26.6	7.6273	8.412	2.32	3.15
7 20 50.6	129	23 57 0.53	57 0.52	1 42 49.6	42 49.7	7.6213	8.405	2.33	3.16
8 20 46.7	130	23 57 6.51	57 6.50	1 42 13.3	42 13.4	7.6151	8.398	2.33	3.16
9 20 42.9	131	23 57 12.40	57 12.39	1 41 37.6	41 37.7	7.6087	8.391	2.34	3.17
10 20 39.1	132	23 57 18.20	57 18.19	1 41 2.5	41 2.6	7.6021	8.383	2.34	3.17
11 20 35.3	133	23 57 23.91	57 23.90	1 40 28.0	40 28.1	7.5954	8.376	2.35	3.18
12 20 31.4	134	23 57 29.54	57 29.53	1 39 54.1	39 54.2	7.5884	8.368	2.35	3.18
13 20 27.6	135	23 57 35.08	57 35.07	1 39 20.8	39 20.9	7.5812	8.360	2.36	3.19
14 20 23.8	136	23 57 40.52	57 40.51	1 38 48.2	38 48.3	7.5737	8.352	2.36	3.19
15 20 19.9	137	23 57 45.87	57 45.86	1 38 16.3	38 16.3	7.5659	8.343	2.37	3.20
16 20 16.1	138	23 57 51.12	57 51.11	1 37 44.8	37 44.9	7.5580	8.334	2.37	3.20
17 20 12.3	139	23 57 56.28	57 56.28	1 37 14.1	37 14.2	7.5499	8.325	2.38	3.21
18 20 8.4	140	23 58 1.34	58 1.34	1 36 44.0	36 44.1	7.5416	8.315	2.38	3.21
19 20 4.6	141	23 58 6.30	58 6.30	1 36 14.6	36 14.7	7.5331	8.305	2.39	3.22
20 20 0.7	142	23 58 11.17	58 11.17	1 35 45.9	35 46.0	7.5242	8.295	2.39	3.22
21 19 56.9	143	23 58 15.94	58 15.94	1 35 17.9	35 18.0	7.5150	8.285	2.40	3.22
22 19 53.0	144	23 58 20.60	58 20.60	1 34 50.5	34 50.6	7.5055	8.274	2.40	3.23
23 19 49.2	145	23 58 25.16	58 25.16	1 34 23.8	34 23.9	7.4957	8.263	2.41	3.23
24 19 45.3	146	23 58 29.62	58 29.62	1 33 57.8	33 57.9	7.4856	8.251	2.41	3.23
25 19 41.5	147	23 58 33.97	58 33.97	1 33 32.5	33 32.5	7.4752	8.239	2.41	3.23
26 19 37.6	148	23 58 38.22	58 38.22	1 33 7.9	33 7.9	7.4644	8.227	2.42	3.24
27 19 33.7	149	23 58 42.36	58 42.36	1 32 44.0	32 44.0	7.4531	8.214	2.42	3.24
28 19 29.8	150	23 58 46.40	58 46.40	1 32 20.8	32 20.8	7.4415	8.201	2.42	3.24
29 19 26.0	151	23 58 50.33	58 50.33	1 31 58.3	31 58.3	7.4297	8.187	2.42	3.24
30 19 22.1	152	23 58 54.15	58 54.15	1 31 36.6	31 36.6	7.4175	8.172	2.43	3.25
31 19 18.2	153	23 58 57.86	58 57.86	1 31 15.6	31 15.6	7.4050	8.157	2.43	3.25
June 1 19 14.3	154	23 59 1.47	59 1.47	1 30 55.3	30 55.3	7.3920	8.141	2.43	3.25
2 19 10.5	155	23 59 4.97	59 4.97	1 30 35.7	30 35.7	7.3785	8.125	2.43	3.25
3 19 6.6	156	23 59 8.35	59 8.35	1 30 16.9	30 16.9	7.3644	8.108	2.44	3.26
4 19 2.7	157	23 59 11.62	59 11.62	1 29 58.8	29 58.8	7.3498	8.091	2.44	3.26
5 18 58.8	158	23 59 14.78	59 14.78	1 29 41.4	29 41.4	7.3344	8.073	2.44	3.26
6 18 55.0	159	23 59 17.83	59 17.83	1 29 24.8	29 24.8	7.3180	8.053	2.44	3.26
7 18 51.1	160	23 59 20.77	59 20.77	1 29 8.9	29 8.9	7.3010	8.033	2.45	3.27
8 18 47.2	161	23 59 23.59	59 23.59	1 28 53.8	28 53.8	7.2833	8.010	2.45	3.27
9 18 43.3	162	23 59 26.30	59 26.30	1 28 39.5	28 39.5	7.2649	7.986	2.45	3.27
10 18 39.4	163	23 59 28.89	59 28.89	1 28 25.9	28 25.9	7.2456	7.962	2.45	3.27
11 18 35.5	164	23 59 31.37	59 31.37	1 28 13.1	28 13.1	7.2254	7.936	2.46	3.27
12 18 31.6	165	23 59 33.73	59 33.73	1 28 1.0	28 1.0	7.2039	7.909	2.46	3.28
13 18 27.7	166	23 59 35.98	59 35.98	1 27 49.7	27 49.7	7.1811	7.880	2.46	3.28
14 18 23.8	167	23 59 38.11	59 38.11	1 27 39.2	27 39.2	7.1571	7.849	2.46	3.28
15 18 19.9	168	23 59 40.12	59 40.12	1 27 29.4	27 29.4	7.1317	7.815	2.46	3.28
16 18 16.0	169	23 59 42.02	59 42.02	1 27 20.4	27 20.4	7.1047	7.776	2.46	3.28
17 18 12.1	170	23 59 43.80	59 43.80	1 27 12.2	27 12.2	7.0759	7.734	2.47	3.28
18 18 8.2	171	23 59 45.46	59 45.46	1 27 4.8	27 4.8	7.0451	7.687	2.47	3.28
19 18 4.3	172	23 59 47.00	59 47.00	1 26 58.2	26 58.2	7.0119	7.636	2.47	3.28
20 18 0.4	173	23 59 48.42	59 48.42	1 26 52.4	26 52.4	6.9760	7.578	2.47	3.28
21 17 56.5	174	23 59 49.73	59 49.73	1 26 47.3	26 47.3	6.9368	7.511	2.47	3.28
22 17 52.6	175	23 59 50.92	59 50.92	1 26 43.1	26 43.1	6.8928	7.433	2.47	3.28
23 17 48.7	176	23 59 51.98	59 51.98	1 26 39.6	26 39.6	6.8438	7.336	2.47	3.28
24 17 44.8	177	23 59 52.92	59 52.92	1 26 36.9	26 36.9	6.7886	7.213	2.47	3.28
25 17 40.9	178	23 59 53.75	59 53.75	1 26 34.9	26 34.9	6.7284	7.039	2.47	3.28
26 17 36.9	179	23 59 54.45	59 54.45	1 26 33.7	26 33.7	6.6478	6.745	2.47	3.28
27 17 33.0	180	23 59 55.03	59 55.03	1 26 33.3	26 33.3	6.5576	+ 5.240	2.47	3.28
28 17 29.1	181	23 59 55.49	59 55.49	1 26 33.7	26 33.7	6.4448	- 6.717	2.47	3.28
29 17 25.1	182	23 59 55.83	59 55.83	1 26 34.8	26 34.8	6.2926	7.025	2.47	3.28
30 17 21.2	183	23 59 56.05	59 56.05	1 26 36.7	26 36.7	6.0591	7.203	2.47	3.28
31 17 17.3	184	23 59 56.16	59 56.16	1 26 39.4	26 39.4	+5.5183	- 7.330	-2.47	-3.28



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
July	d. h. m.	h. m. s.	m. s.	° ' "	° ' "				
1 17 17.3	184	23 59 56.16	59 56.16	1 26 39.4	26 39.4	+5.5183	- 7.330	-2.47	-3.28
2 17 13.4	185	23 59 56.15	59 56.15	1 26 42.9	26 42.9	-5.6867	7.426	2.47	3.27
3 17 9.4	186	23 59 56.02	59 56.02	1 26 47.1	26 47.1	6.1146	7.504	2.47	3.27
4 17 5.5	187	23 59 55.77	59 55.77	1 26 52.1	26 52.1	6.3259	7.570	2.47	3.27
5 17 1.5	188	23 59 55.41	59 55.41	1 26 57.8	26 57.8	6.4675	7.627	2.46	3.27
6 16 57.6	189	23 59 54.93	59 54.93	1 27 4.3	27 4.3	6.5740	7.677	2.46	3.27
7 16 53.6	190	23 59 54.33	59 54.33	1 27 11.5	27 11.5	6.6595	7.722	2.46	3.27
8 16 49.7	191	23 59 53.61	59 53.61	1 27 19.5	27 19.5	6.7309	7.763	2.46	3.27
9 16 45.7	192	23 59 52.78	59 52.78	1 27 28.2	27 28.2	6.7922	7.801	2.46	3.26
10 16 41.8	193	23 59 51.83	59 51.83	1 27 37.7	27 37.7	6.8460	7.835	2.46	3.26
11 16 37.8	194	23 59 50.76	59 50.76	1 27 47.9	27 47.9	6.8938	7.867	2.46	3.26
12 16 33.9	195	23 59 49.57	59 49.57	1 27 58.9	27 58.9	6.9365	7.896	2.45	3.26
13 16 29.9	196	23 59 48.27	59 48.27	1 28 10.6	28 10.6	6.9752	7.923	2.45	3.26
14 16 26.0	197	23 59 46.85	59 46.85	1 28 23.1	28 23.1	7.0104	7.949	2.45	3.25
15 16 22.0	198	23 59 45.32	59 45.32	1 28 36.3	28 36.3	7.0430	7.974	2.45	3.25
16 16 18.1	199	23 59 43.67	59 43.67	1 28 50.2	28 50.2	7.0727	7.996	2.45	3.25
17 16 14.1	200	23 59 41.91	59 41.91	1 29 4.8	29 4.8	7.1005	8.018	2.44	3.25
18 16 10.2	201	23 59 40.04	59 40.04	1 29 20.1	29 20.1	7.1267	8.038	2.44	3.24
19 16 6.2	202	23 59 38.06	59 38.06	1 29 36.2	29 36.2	7.1513	8.057	2.44	3.24
20 16 2.2	203	23 59 35.97	59 35.97	1 29 53.0	29 53.0	7.1741	8.075	2.44	3.24
21 15 58.3	204	23 59 33.77	59 33.77	1 30 10.4	30 10.4	7.1957	8.092	2.43	3.23
22 15 54.3	205	23 59 31.45	59 31.45	1 30 28.5	30 28.5	7.2160	8.108	2.43	3.23
23 15 50.3	206	23 59 29.03	59 29.03	1 30 47.3	30 47.3	7.2352	8.124	2.42	3.22
24 15 46.3	207	23 59 26.50	59 26.50	1 31 6.8	31 6.8	7.2532	8.139	2.42	3.22
25 15 42.3	208	23 59 23.86	59 23.86	1 31 26.9	31 26.9	7.2706	8.153	2.41	3.21
26 15 38.3	209	23 59 21.12	59 21.12	1 31 47.7	31 47.7	7.2869	8.167	2.41	3.21
27 15 34.3	210	23 59 18.28	59 18.28	1 32 9.1	32 9.1	7.3025	8.180	2.40	3.20
28 15 30.4	211	23 59 15.34	59 15.34	1 32 31.2	32 31.2	7.3177	8.192	2.40	3.20
29 15 26.4	212	23 59 12.30	59 12.30	1 32 53.9	32 53.9	7.3323	8.204	2.39	3.19
30 15 22.4	213	23 59 9.15	59 9.15	1 33 17.2	33 17.2	7.3463	8.215	2.39	3.19
31 15 18.4	214	23 59 5.91	59 5.91	1 33 41.2	33 41.2	7.3595	8.226	2.38	3.18
Aug. 1 15 14.4	215	23 59 2.57	59 2.57	1 34 5.8	34 5.8	7.3721	8.237	2.38	3.18
2 15 10.4	216	23 58 59.13	58 59.13	1 34 31.0	34 31.0	7.3842	8.247	2.37	3.17
3 15 6.4	217	23 58 55.60	58 55.60	1 34 56.7	34 56.7	7.3958	8.257	2.37	3.16
4 15 2.4	218	23 58 51.97	58 51.97	1 35 23.0	35 23.0	7.4070	8.267	2.36	3.15
5 14 58.4	219	23 58 48.25	58 48.25	1 35 49.9	35 49.9	7.4178	8.276	2.36	3.15
6 14 54.4	220	23 58 44.43	58 44.44	1 36 17.4	36 17.4	7.4282	8.285	2.35	3.14
7 14 50.4	221	23 58 40.52	58 40.53	1 36 45.4	36 45.4	7.4383	8.293	2.34	3.13
8 14 46.4	222	23 58 36.53	58 36.54	1 37 14.0	37 14.0	7.4480	8.301	2.33	3.12
9 14 42.4	223	23 58 32.45	58 32.46	1 37 43.1	37 43.1	7.4573	8.309	2.33	3.11
10 14 38.4	224	23 58 28.28	58 28.29	1 38 12.7	38 12.7	7.4662	8.317	2.32	3.10
11 14 34.4	225	23 58 24.03	58 24.04	1 38 42.8	38 42.8	7.4748	8.325	2.31	3.09
12 14 30.4	226	23 58 19.69	58 19.70	1 39 13.5	39 13.5	7.4831	8.332	2.30	3.08
13 14 26.4	227	23 58 15.27	58 15.28	1 39 44.7	39 44.6	7.4911	8.339	2.29	3.07
14 14 22.4	228	23 58 10.77	58 10.78	1 40 16.3	40 16.2	7.4988	8.345	2.28	3.06
15 14 18.4	229	23 58 6.19	58 6.20	1 40 48.4	40 48.3	7.5062	8.351	2.27	3.05
16 14 14.4	230	23 58 1.53	58 1.54	1 41 20.9	41 20.8	7.5133	8.357	2.26	3.04
17 14 10.4	231	23 57 56.80	57 56.81	1 41 53.9	41 53.8	7.5202	8.363	2.25	3.03
18 14 6.4	232	23 57 51.99	57 52.00	1 42 27.3	42 27.2	7.5269	8.369	2.24	3.02
19 14 2.4	233	23 57 47.11	57 47.12	1 43 1.1	43 1.0	7.5332	8.374	2.23	3.01
20 13 58.4	234	23 57 42.16	57 42.17	1 43 35.4	43 35.3	7.5393	8.379	2.21	2.99
21 13 54.3	235	23 57 37.14	57 37.15	1 44 10.1	44 10.0	7.5451	8.384	2.20	2.98
22 13 50.3	236	23 57 32.06	57 32.07	1 44 45.1	44 45.0	7.5506	8.389	2.19	2.96
23 13 46.3	237	23 57 26.92	57 26.93	1 45 20.5	45 20.4	7.5559	8.393	2.18	2.95
24 13 42.3	238	23 57 21.71	57 21.72	1 45 56.3	45 56.2	7.5609	8.397	2.16	2.93
25 13 38.3	239	23 57 16.44	57 16.45	1 46 32.4	46 32.3	7.5656	8.401	2.15	2.92
26 13 34.3	240	23 57 11.12	57 11.13	1 47 8.8	47 8.7	7.5702	8.405	2.13	2.90
27 13 30.3	241	23 57 5.74	57 5.75	1 47 45.5	47 45.4	7.5746	8.409	2.12	2.88
28 13 26.3	242	23 57 0.31	57 0.32	1 48 22.6	48 22.5	7.5788	8.413	2.10	2.86
29 13 22.3	243	23 56 54.82	56 54.84	1 49 0.0	48 59.9	7.5828	8.416	2.09	2.84
30 13 18.2	244	23 56 49.29	56 49.31	1 49 37.6	49 37.5	7.5867	8.419	2.07	2.82
31 13 14.2	245	23 56 43.71	56 43.73	1 50 15.5	50 15.4	-7.5903	- 8.422	-2.06	-2.80



FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.													
Mean Solar Time of Meridian Transit.			Sidereal Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> <sup>2</sup> .			
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
d. h. m.			h. m. s.	m. s.		° ' "	' "						
Sept.	1	13 10.2	246	23 56 38.08	56 38.10	—	1 50 53.6	50 53.5	—7.5937	—	8.425	—2.04	—2.77
	2	13 6.2	247	23 56 32.41	56 32.43		1 51 31.9	51 31.8	7.5968		8.428	2.02	2.73
	3	13 2.2	248	23 56 26.70	56 26.72		1 52 10.5	52 10.4	7.5998		8.430	1.99	—2.68
	4	12 58.1	249	23 56 20.95	56 20.97		1 52 49.3	52 49.2	7.6027		8.432	1.97	
	5	12 54.1	250	23 56 15.16	56 15.18		1 53 28.3	53 28.2	7.6055		8.434	1.94	
	6	12 50.1	251	23 56 9.33	56 9.35		1 54 7.5	54 7.4	7.6082		8.436	1.91	
	7	12 46.1	252	23 56 3.47	56 3.49		1 54 46.8	54 46.7	7.6107		8.438	1.88	
	8	12 42.0	253	23 55 57.58	55 57.60		1 55 26.3	55 26.2	7.6129		8.439	1.84	
	9	12 38.0	254	23 55 51.66	55 51.68		1 56 5.9	56 5.8	7.6151		8.440	1.80	
	10	12 34.0	255	23 55 45.71	55 45.73		1 56 45.6	56 45.5	7.6170		8.441	—1.75	
	11	12 29.9	256	23 55 39.74	55 39.76		1 57 25.4	57 25.3	7.6187		8.442		
	12	12 25.9	257	23 55 33.74	55 33.76		1 58 5.3	58 5.2	7.6202		8.443		
	13	12 21.9	258	23 55 27.73	55 27.75		1 58 45.3	58 45.2	7.6215		8.444		
	14	12 17.8	259	23 55 21.70	55 21.72		1 59 25.4	59 25.3	7.6225		8.445		
	15	12 13.8	260	23 55 15.65	55 15.67		2 0 5.5	0 5.4	7.6234		8.445		
	16	12 9.8	261	23 55 9.59	55 9.61		2 0 45.6	0 45.5	7.6240		8.445		
	17	12 5.7	262	23 55 3.53	55 3.55		2 1 25.7	1 25.6	7.6246		8.445		
	18	12 1.7	263	23 54 57.46	54 57.48		2 2 5.8	2 5.7	7.6251		8.445		
	19	11 57.7	264	23 54 51.38	54 51.40		2 2 45.9	2 45.8	7.6255		8.444		
	20	11 53.6	265	23 54 45.30	54 45.32		2 3 25.9	3 25.8	7.6257		8.444		
	21	11 49.6	266	23 54 39.21	54 39.23		2 4 5.9	4 5.8	7.6258		8.443		
	22	11 45.6	267	23 54 33.13	54 33.16		2 4 45.8	4 45.7	7.6255		8.442		
	23	11 41.5	268	23 54 27.05	54 27.08		2 5 25.7	5 25.6	7.6250		8.441		
	24	11 37.5	269	23 54 20.98	54 21.01		2 6 5.4	6 5.3	7.6244		8.440		
	25	11 33.4	270	23 54 14.92	54 14.95		2 6 45.0	6 44.9	7.6237		8.439		
	26	11 29.4	271	23 54 8.87	54 8.90		2 7 24.5	7 24.4	7.6228		8.438		
	27	11 25.4	272	23 54 2.83	54 2.86		2 8 3.8	8 3.7	7.6218		8.436		
	28	11 21.3	273	23 53 56.81	53 56.84		2 8 42.9	8 42.8	7.6208		8.434		
	29	11 17.3	274	23 53 50.81	53 50.84		2 9 21.9	9 21.8	7.6195		8.432		
	30	11 13.3	275	23 53 44.83	53 44.86		2 10 0.7	10 0.6	7.6178		8.430	+1.77	
Oct.	1	11 9.3	276	23 53 38.87	53 38.90		2 10 39.3	10 39.2	7.6159		8.428	1.81	+2.69
	2	11 5.2	277	23 53 32.94	53 32.97		2 11 17.7	11 17.6	7.6137		8.426	1.84	2.75
	3	11 1.2	278	23 53 27.04	53 27.07		2 11 55.9	11 55.8	7.6114		8.423	1.87	2.79
	4	10 57.2	279	23 53 21.17	53 21.20		2 12 33.8	12 33.7	7.6091		8.420	1.90	2.82
	5	10 53.2	280	23 53 15.33	53 15.36		2 13 11.5	13 11.4	7.6066		8.417	1.93	2.84
	6	10 49.1	281	23 53 9.52	53 9.55		2 13 48.9	13 48.8	7.6040		8.413	1.96	2.86
	7	10 45.1	282	23 53 3.75	53 3.78		2 14 26.0	14 25.9	7.6013		8.409	1.98	2.88
	8	10 41.1	283	23 52 58.02	52 58.05		2 15 2.7	15 2.6	7.5986		8.405	2.01	2.90
	9	10 37.1	284	23 52 52.33	52 52.36		2 15 39.1	15 39.0	7.5956		8.401	2.03	2.92
	10	10 33.0	285	23 52 46.68	52 46.71		2 16 15.2	16 15.1	7.5923		8.397	2.06	2.94
	11	10 29.0	286	23 52 41.08	52 41.11		2 16 50.9	16 50.8	7.5886		8.392	2.08	2.96
	12	10 25.0	287	23 52 35.53	52 35.56		2 17 26.2	17 26.1	7.5844		8.388	2.10	2.98
	13	10 21.0	288	23 52 30.03	52 30.06		2 18 1.2	18 1.1	7.5801		8.383	2.12	2.99
	14	10 16.9	289	23 52 24.58	52 24.61		2 18 35.8	18 35.7	7.5757		8.378	2.14	3.01
	15	10 12.9	290	23 52 19.19	52 19.22		2 19 10.0	19 9.9	7.5710		8.373	2.16	3.02
	16	10 8.9	291	23 52 13.86	52 13.89		2 19 43.8	19 43.7	7.5662		8.368	2.18	3.04
	17	10 4.9	292	23 52 8.58	52 8.61		2 20 17.1	20 17.0	7.5613		8.362	2.19	3.05
	18	10 0.8	293	23 52 3.36	52 3.39		2 20 50.0	20 49.9	7.5565		8.356	2.21	3.06
	19	9 56.8	294	23 51 58.21	51 58.24		2 21 22.4	21 22.3	7.5513		8.350	2.22	3.07
	20	9 52.8	295	23 51 53.12	51 53.15		2 21 54.3	21 54.2	7.5455		8.344	2.23	3.08
	21	9 48.8	296	23 51 48.10	51 48.13		2 22 25.8	22 25.7	7.5393		8.337	2.24	3.09
	22	9 44.8	297	23 51 43.15	51 43.18		2 22 56.8	22 56.7	7.5327		8.330	2.25	3.10
	23	9 40.8	298	23 51 38.28	51 38.31		2 23 27.2	23 27.1	7.5260		8.322	2.26	3.11
	24	9 36.7	299	23 51 33.48	51 33.50		2 23 57.1	23 57.0	7.5193		8.314	2.27	3.12
	25	9 32.7	300	23 51 28.76	51 28.78		2 24 26.4	24 26.3	7.5123		8.306	2.28	3.13
	26	9 28.7	301	23 51 24.11	51 24.13		2 24 55.2	24 55.1	7.5049		8.297	2.29	3.14
	27	9 24.7	302	23 51 19.55	51 19.57		2 25 23.4	25 23.3	7.4972		8.288	2.30	3.15
	28	9 20.7	303	23 51 15.07	51 15.09		2 25 51.0	25 50.9	7.4890		8.279	2.31	3.16
	29	9 16.7	304	23 51 10.67	51 10.69		2 26 18.1	26 18.0	7.4806		8.269	2.32	3.17
	30	9 12.7	305	23 51 6.36	51 6.38		2 26 44.6	26 44.5	7.4721		8.259	2.33	3.18
	31	9 8.7	306	23 51 2.13	51 2.15		2 27 10.5	27 10.4	7.4633		8.249	2.34	3.18
	32	9 4.7	307	23 50 57.99	50 58.01	—	2 27 35.8	27 35.7	—7.4543	—	8.239	+2.35	+3.19



## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
Nov.	d.	h. m.		h. m. s.	m. s.	°	' "				
	1	9 4.7	307	23 50 57.99	50 58.01	- 2	27 35.8	-7.4543	- 8.239	+2.35	+3.20
	2	9 0.7	308	23 50 53.94	50 53.96	2	28 0.4	7.4448	8.228	2.36	3.20
	3	8 56.7	309	23 50 49.98	50 50.00	2	28 24.4	7.4348	8.217	2.37	3.21
	4	8 52.7	310	23 50 46.11	50 46.13	2	28 47.8	7.4243	8.205	2.37	3.21
	5	8 48.7	311	23 50 42.34	50 42.36	2	29 10.5	7.4128	8.193	2.38	3.22
	6	8 44.7	312	23 50 38.66	50 38.68	2	29 32.6	7.4009	8.180	2.39	3.22
	7	8 40.7	313	23 50 35.08	50 35.10	2	29 54.0	7.3888	8.166	2.40	3.23
	8	8 36.7	314	23 50 31.61	50 31.63	2	30 14.7	7.3763	8.151	2.40	3.23
	9	8 32.8	315	23 50 28.24	50 28.25	2	30 34.7	7.3634	8.135	2.41	3.24
	10	8 28.8	316	23 50 24.97	50 24.98	2	30 54.0	7.3498	8.119	2.41	3.24
	11	8 24.8	317	23 50 21.81	50 21.82	2	31 12.5	7.3354	8.102	2.42	3.25
	12	8 20.8	318	23 50 18.75	50 18.76	2	31 30.3	7.3202	8.085	2.42	3.25
	13	8 16.8	319	23 50 15.79	50 15.80	2	31 47.4	7.3041	8.066	2.43	3.26
	14	8 12.8	320	23 50 12.95	50 12.96	2	32 3.8	7.2872	8.046	2.43	3.26
	15	8 8.9	321	23 50 10.22	50 10.23	2	32 19.4	7.2694	8.025	2.44	3.27
	16	8 4.9	322	23 50 7.60	50 7.61	2	32 34.3	7.2507	8.003	2.44	3.27
	17	8 0.9	323	23 50 5.09	50 5.10	2	32 48.4	7.2308	7.980	2.44	3.28
	18	7 56.9	324	23 50 2.70	50 2.71	2	33 1.8	7.2099	7.955	2.45	3.28
	19	7 53.0	325	23 50 0.42	50 0.43	2	33 14.4	7.1880	7.928	2.45	3.28
	20	7 49.0	326	23 49 58.26	49 58.27	2	33 26.2	7.1649	7.900	2.45	3.28
	21	7 45.0	327	23 49 56.21	49 56.22	2	33 37.2	7.1399	7.870	2.46	3.28
	22	7 41.1	328	23 49 54.28	49 54.29	2	33 47.5	7.1135	7.837	2.46	3.29
	23	7 37.1	329	23 49 52.47	49 52.48	2	33 57.0	7.0853	7.800	2.47	3.29
	24	7 33.1	330	23 49 50.77	49 50.78	2	34 5.7	7.0551	7.759	2.47	3.29
	25	7 29.2	331	23 49 49.19	49 49.19	2	34 13.6	7.0220	7.715	2.47	3.29
	26	7 25.2	332	23 49 47.74	49 47.74	2	34 20.7	6.9862	7.664	2.48	3.29
	27	7 21.2	333	23 49 46.41	49 46.41	2	34 27.0	6.9463	7.608	2.48	3.29
	28	7 17.3	334	23 49 45.20	49 45.20	2	34 32.4	6.9023	7.543	2.48	3.29
	29	7 13.3	335	23 49 44.12	49 44.12	2	34 37.0	6.8535	7.466	2.49	3.29
	30	7 9.4	336	23 49 43.15	49 43.15	2	34 40.9	6.7983	7.373	2.49	3.30
Dec.	1	7 5.4	337	23 49 42.30	49 42.30	2	34 43.9	6.7351	7.255	2.49	3.30
	2	7 1.5	338	23 49 41.58	49 41.58	2	34 46.1	6.6612	7.091	2.49	3.30
	3	6 57.5	339	23 49 40.98	49 40.98	2	34 47.5	6.5700	6.818	2.50	3.30
	4	6 53.6	340	23 49 40.51	49 40.51	2	34 48.1	6.4544	- 5.938	2.50	3.30
	5	6 49.7	341	23 49 40.16	49 40.16	2	34 47.8	6.2965	+ 6.687	2.50	3.30
	6	6 45.8	342	23 49 39.94	49 39.94	2	34 46.7	6.0457	7.025	2.50	3.30
	7	6 41.8	343	23 49 39.84	49 39.84	2	34 44.7	-5.3535	7.213	2.50	3.30
	8	6 37.9	344	23 49 39.87	49 39.87	2	34 42.0	+5.8194	7.343	2.49	3.30
	9	6 34.0	345	23 49 40.03	49 40.03	2	34 38.4	6.1938	7.445	2.49	3.30
	10	6 30.0	346	23 49 40.32	49 40.32	2	34 34.0	6.3919	7.527	2.49	3.30
	11	6 26.1	347	23 49 40.74	49 40.73	2	34 28.8	6.5265	7.596	2.49	3.30
	12	6 22.2	348	23 49 41.29	49 41.28	2	34 22.7	6.6287	7.656	2.49	3.30
	13	6 18.3	349	23 49 41.97	49 41.96	2	34 15.8	6.7109	7.708	2.49	3.30
	14	6 14.4	350	23 49 42.77	49 42.76	2	34 8.0	6.7798	7.755	2.49	3.30
	15	6 10.4	351	23 49 43.70	49 43.69	2	33 59.4	6.8395	7.798	2.49	3.30
	16	6 6.5	352	23 49 44.76	49 44.75	2	33 50.0	6.8918	7.836	2.49	3.29
	17	6 2.6	353	23 49 45.95	49 45.94	2	33 39.7	6.9385	7.871	2.49	3.29
	18	5 58.7	354	23 49 47.26	49 47.25	2	33 28.6	6.9807	7.903	2.49	3.29
	19	5 54.8	355	23 49 48.70	49 48.69	2	33 16.7	7.0192	7.933	2.48	3.29
	20	5 50.9	356	23 49 50.27	49 50.26	2	33 3.9	7.0545	7.961	2.48	3.29
	21	5 47.0	357	23 49 51.97	49 51.96	2	32 50.4	7.0871	7.987	2.48	3.29
	22	5 43.1	358	23 49 53.80	49 53.78	2	32 36.0	7.1175	8.011	2.48	3.29
	23	5 39.2	359	23 49 55.75	49 55.73	2	32 20.8	7.1453	8.034	2.48	3.29
	24	5 35.3	360	23 49 57.82	49 57.80	2	32 4.8	7.1715	8.056	2.47	3.29
	25	5 31.4	361	23 50 0.02	50 0.00	2	31 48.1	7.1957	8.076	2.47	3.28
	26	5 27.5	362	23 50 2.24	50 2.22	2	31 30.5	7.2187	8.096	2.47	3.28
	27	5 23.6	363	23 50 4.78	50 4.76	2	31 12.1	7.2404	8.114	2.47	3.28
	28	5 19.7	364	23 50 7.85	50 7.83	2	30 53.0	7.2612	8.132	2.46	3.28
	29	5 15.8	365	23 50 10.04	50 10.02	2	30 33.1	7.2808	8.149	2.46	3.28
	30	5 11.9	366	23 50 12.85	50 12.83	2	30 12.4	7.2995	8.165	2.46	3.27
	31	5 8.0	367	23 50 15.78	50 15.76	2	29 50.9	7.3173	8.181	2.45	3.27
	32	5 4.1	368	23 50 18.83	50 18.81	- 2	29 28.7	+7.3344	+ 8.196	+2.45	+3.27



## HORIZONTAL PARALLAXES AND SEMIDIAMETERS.

Sidereal Date.	HORIZONTAL PARALLAXES.			VERTICAL SEMIDIAMETER.			SID. TIME OF SEMIDIAMETER PASSING THE MERIDIAN.		
	♂	♀	♂	♂	♀	♂	♂	♀	♂
d.	"	"	"	"	"	"	"	"	"
1	8.75	5.68	4.50	3.41	5.63	2.65	0.25	0.40	0.18
6	7.96	5.77	4.60	3.11	5.70	2.71	0.23	0.40	0.19
11	7.39	5.82	4.72	2.88	5.77	2.78	0.21	0.40	0.19
16	6.97	5.91	4.85	2.72	5.87	2.85	0.20	0.41	0.20
21	6.66	6.00	4.98	2.59	5.96	2.94	0.19	0.41	0.20
26	6.43	6.10	5.12	2.50	6.06	3.02	0.18	0.41	0.21
31	6.27	6.21	5.27	2.45	6.17	3.11	0.18	0.42	0.22
36	6.18	6.32	5.43	2.41	6.28	3.20	0.17	0.42	0.23
41	6.13	6.45	5.59	2.39	6.41	3.30	0.17	0.43	0.23
46	6.15	6.58	5.78	2.40	6.54	3.40	0.17	0.44	0.24
51	6.25	6.73	5.98	2.44	6.68	3.52	0.17	0.45	0.25
56	6.46	6.90	6.19	2.51	6.85	3.64	0.17	0.46	0.26
61	6.81	7.07	6.42	2.65	7.03	3.78	0.18	0.47	0.27
66	7.40	7.25	6.66	2.88	7.20	3.92	0.19	0.49	0.28
71	8.29	7.44	6.91	3.23	7.40	4.08	0.22	0.50	0.29
76	9.55	7.67	7.19	3.71	7.62	4.24	0.25	0.52	0.31
81	11.12	7.91	7.49	4.33	7.86	4.42	0.29	0.55	0.32
86	12.78	8.17	7.80	4.99	8.11	4.61	0.34	0.56	0.34
91	14.12	8.45	8.14	5.51	8.39	4.81	0.37	0.60	0.35
96	14.70	8.77	8.51	5.73	8.73	5.02	0.37	0.63	0.37
101	14.41	9.11	8.91	5.61	9.08	5.26	0.37	0.66	0.39
106	13.56	9.50	9.33	5.28	9.47	5.51	0.35	0.69	0.41
111	12.47	9.92	9.79	4.86	9.89	5.79	0.32	0.73	0.42
116	11.36	10.39	10.28	4.44	10.34	6.08	0.29	0.77	0.44
121	10.37	10.90	10.81	4.04	10.85	6.39	0.27	0.81	0.46
126	9.43	11.48	11.38	3.68	11.43	6.71	0.24	0.85	0.48
131	8.68	12.09	12.00	3.38	12.09	7.08	0.23	0.90	0.51
136	8.01	12.86	12.64	3.12	12.80	7.46	0.21	0.95	0.54
141	7.44	13.68	13.35	2.90	13.66	7.88	0.20	1.01	0.57
146	7.00	14.61	14.10	2.73	14.56	8.32	0.19	1.07	0.61
151	6.68	15.67	14.90	2.60	15.62	8.79	0.19	1.15	0.64
156	6.51	16.85	15.73	2.53	16.78	9.28	0.18	1.21	0.68
161	6.51	18.17	16.59	2.54	18.11	9.79	0.18	1.30	0.71
166	6.69	19.67	17.48	2.60	19.60	10.32	0.19	1.40	0.76
171	7.00	21.32	18.35	2.72	21.23	10.83	0.20	1.50	0.80
176	7.44	23.12	19.20	2.90	23.03	11.33	0.21	1.62	0.84
181	7.98	24.97	19.99	3.11	24.88	11.80	0.22	1.74	0.88
186	8.64	26.74	20.69	3.37	26.65	12.21	0.24	1.86	0.92
191	9.38	28.24	21.27	3.66	28.17	12.55	0.26	1.96	0.94
196	10.25	29.25	21.69	4.01	29.19	12.77	0.28	2.03	0.95
201	11.21	29.58	21.91	4.37	29.47	12.93	0.30	2.04	0.96
206	12.25	29.15	21.93	4.78	29.02	12.94	0.33	2.01	0.95
211	13.27	28.08	21.76	5.17	27.98	12.84	0.35	1.93	0.95
216	14.06	26.50	21.41	5.48	26.41	12.63	0.37	1.83	0.94
221	14.26	24.77	20.92	5.57	24.65	12.34	0.38	1.71	0.93
226	13.57	22.97	20.30	5.31	22.88	11.97	0.37	1.59	0.91
231	12.23	21.27	19.61	4.77	21.16	11.57	0.33	1.47	0.88
236	10.62	19.64	18.86	4.14	19.62	11.13	0.29	1.37	0.84
241	9.14	18.26	18.08	3.56	18.19	10.67	0.25	1.28	0.80
246	7.98	16.97	17.32	3.11	16.90	10.22	0.22	1.18	0.77
251	7.12	15.82	16.55	2.78	15.75	9.76	0.20	1.10	0.73
256	6.61	14.79	15.80	2.58	14.74	9.32	0.18	1.03	0.70
261	6.32	13.89	15.09	2.46	13.84	8.90	0.17	0.96	0.67
266	6.16	13.10	14.41	2.40	13.03	8.50	0.16	0.90	0.63
271	6.08	12.39	13.76	2.37	12.30	8.12	0.16	0.84	0.60
276	6.09	11.76	13.14	2.37	11.66	7.76	0.16	0.80	0.56
281	6.15	11.17	12.56	2.40	11.09	7.41	0.16	0.75	0.53
286	6.27	10.65	12.02	2.45	10.58	7.09	0.17	0.72	0.50
291	6.45	10.18	11.51	2.52	10.11	6.79	0.18	0.68	0.48
296	6.71	9.76	11.01	2.62	9.69	6.49	0.18	0.65	0.46



## HORIZONTAL PARALLAXES AND SEMIDIAMETERS.

0 <sup>h</sup> . Sidereal Date.	HORIZONTAL PARALLAXES.			VERTICAL SEMIDIAMETER.			SID. TIME OF SEMIDIAMETER PASSING THE MERIDIAN.		
	♂	♀	♂	♂	♀	♂	♂	♀	♂
d.	"	"	"	"	"	"	"	"	"
301	7.06	9.85	10.55	2.75	9.29	6.28	0.19	0.62	0.44
306	7.52	9.01	10.13	2.93	8.95	5.98	0.20	0.60	0.42
311	8.17	8.70	9.72	3.19	8.64	5.74	0.22	0.58	0.40
316	9.06	8.39	9.34	3.53	8.34	5.52	0.26	0.56	0.38
321	10.21	8.12	8.98	4.07	8.06	5.31	0.30	0.54	0.37
326	11.57	7.86	8.65	4.51	7.81	5.10	0.33	0.52	0.35
331	12.57	7.64	8.33	4.90	7.56	4.91	0.33	0.51	0.34
336	12.32	7.41	8.03	4.80	7.36	4.73	0.32	0.50	0.33
341	11.02	7.18	7.75	4.30	7.17	4.57	0.30	0.49	0.32
346	9.64	6.99	7.48	3.76	6.98	4.41	0.26	0.48	0.31
351	8.54	6.82	7.22	3.33	6.81	4.26	0.23	0.46	0.30
356	7.74	6.68	6.98	3.02	6.66	4.12	0.21	0.46	0.29
361	7.18	6.55	6.75	2.80	6.51	3.98	0.20	0.45	0.29
366	6.77	6.43	6.54	2.64	6.40	3.86	0.19	0.45	0.28
0 <sup>h</sup> . Sidereal Date.	♂	♀	♂	♂	♀	♂	♂	♀	♂
d.	"	"	"	"	"	"	"	"	"
1	2.02	1.01	0.46	22.62	9.23	1.81	1.69	0.63	0.13
11	2.02	1.02	0.46	22.67	9.34	1.80	1.69	0.64	0.13
21	2.00	1.03	0.46	22.55	9.43	1.78	1.68	0.65	0.13
31	1.98	1.04	0.45	22.28	9.49	1.77	1.67	0.66	0.13
41	1.94	1.04	0.45	21.88	9.51	1.75	1.64	0.66	0.13
51	1.90	1.04	0.44	21.37	9.50	1.74	1.60	0.66	0.12
61	1.85	1.04	0.44	20.80	9.45	1.72	1.56	0.65	0.12
71	1.79	1.03	0.44	20.18	9.37	1.71	1.51	0.65	0.12
81	1.73	1.03	0.43	19.55	9.36	1.70	1.46	0.64	0.12
91	1.68	1.01	0.43	18.94	9.13	1.68	1.42	0.63	0.12
101	1.63	0.99	0.43	18.36	8.99	1.67	1.37	0.62	0.12
111	1.58	0.97	0.43	17.82	8.83	1.66	1.33	0.61	0.12
121	1.54	0.95	0.42	17.33	8.67	1.66	1.29	0.60	0.12
131	1.50	0.93	0.42	16.90	8.51	1.65	1.26	0.59	0.12
141	1.47	0.92	0.42	16.50	8.36	1.65	1.23	0.58	0.12
151	1.44	0.90	0.42	16.17	8.22	1.65	1.20	0.57	0.12
161	1.41	0.89	0.42	15.89	8.09	1.65	1.18	0.56	0.12
171	1.39	0.87	0.42	15.65	7.97	1.65	1.16	0.55	0.12
181	1.38	0.86	0.43	15.48	7.87	1.66	1.14	0.54	0.12
191	1.37	0.86	0.43	15.35	7.78	1.67	1.13	0.54	0.12
201	1.36	0.85	0.43	15.26	7.71	1.68	1.12	0.53	0.12
211	1.36	0.85	0.43	15.24	7.66	1.69	1.11	0.53	0.12
221	1.36	0.84	0.43	15.25	7.63	1.70	1.11	0.53	0.12
231	1.37	0.84	0.44	15.33	7.61	1.72	1.11	0.53	0.12
241	1.38	0.84	0.44	15.44	7.61	1.73	1.12	0.53	0.12
251	1.39	0.84	0.45	15.61	7.63	1.74	1.13	0.53	0.13
261	1.41	0.84	0.45	15.84	7.68	1.76	1.14	0.53	0.13
271	1.43	0.85	0.45	16.10	7.74	1.78	1.16	0.53	0.13
281	1.46	0.85	0.46	16.43	7.81	1.79	1.18	0.53	0.13
291	1.49	0.86	0.46	16.81	7.90	1.80	1.20	0.54	0.13
301	1.53	0.88	0.46	17.25	8.00	1.81	1.23	0.54	0.13
311	1.57	0.89	0.46	17.72	8.12	1.82	1.26	0.55	0.13
321	1.62	0.91	0.47	18.24	8.25	1.83	1.29	0.56	0.13
331	1.67	0.92	0.47	18.81	8.40	1.83	1.33	0.57	0.13
341	1.72	0.94	0.47	19.38	8.56	1.83	1.37	0.58	0.13
351	1.77	0.96	0.47	19.96	8.71	1.83	1.41	0.59	0.13
361	1.82	0.97	0.47	20.54	8.85	1.82	1.45	0.60	0.13
371	1.86	0.99	0.46	21.06	8.99	1.81	1.49	0.61	0.13

NOTE. — For Neptune the Horizontal Parallax = 0".28 (before 180d. and after 361d.)  
 " " " " = 0".29 (between 180d. and 280d., between 266d. and 361d.)  
 " " " " = 0".30 (between 280d. and 266d.)



# 880 SUN'S COÖRDINATES, 1860.

Date, 1860.	RECTANGULAR EQUATORIAL						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Jan. 1.0	+1806696	6082	—8865993	6200	—3847462	7265	280 35 18.1	5.1	+0.43	9.9 926527
1.5	1892589	1972	8850881	1094	3840902	0707	281 5 53.2	40.1	0.44	926516
2.0	1978331	7711	8835080	5299	3834044	3852	281 36 28.0	14.6	0.46	926511
2.5	2063918	3295	8818593	8818	3826889	6700	282 6 62.6	49.3	0.47	926513
3.0	2149342	8716	8801420	1651	3819437	9251	282 37 37.1	23.7	0.48	926520
3.5	+2234596	3967	—8783563	3800	—3811689	1506	283 7 71.6	58.1	+0.48	926534
4.0	2319674	9042	8765025	5268	3803645	3465	283 38 46.0	32.4	0.47	926554
4.5	2404570	3932	8745807	6056	3795307	5130	284 9 20.3	6.6	0.45	926581
5.0	2489278	8640	8725912	6167	3786675	6501	284 39 54.6	40.8	0.43	926615
5.5	2573791	3151	8705341	5602	3777750	7579	285 10 28.8	15.0	0.39	926655
6.0	+2658102	7459	—8684097	4365	—3768534	8366	285 40 62.9	49.0	+0.35	926703
6.5	2742206	1561	8662180	2434	3759026	8861	286 11 37.0	23.0	0.31	926758
7.0	2826096	5449	8639593	9873	3749228	9067	286 41 71.0	56.9	0.26	926820
7.5	2909767	9118	8616338	6624	3739139	8981	287 12 45.9	30.7	0.20	926889
8.0	2993212	2561	8592417	2709	3728760	8606	287 43 18.8	4.5	0.14	926966
8.5	+3076425	5772	—8567830	8128	—3718093	7942	288 13 52.6	38.2	+0.10	927049
9.0	3159400	8745	8542580	2885	3707138	6991	288 44 26.8	11.8	+0.02	927140
9.5	3242131	1474	8516670	6981	3695896	5752	289 14 60.0	45.4	—0.04	927238
10.0	3324612	3953	8490100	0418	3684368	4228	289 45 33.6	18.9	0.11	927343
10.5	3406838	6178	8462870	3194	3672555	2419	290 15 67.1	52.4	0.18	927455
11.0	+3488801	8139	—8434983	5314	—3660457	0324	290 46 40.6	25.8	—0.23	927573
11.5	3570497	9834	8406442	6779	3648076	7946	291 16 74.1	59.2	0.29	927698
12.0	3651930	1255	8377249	7593	3635412	5286	291 47 47.5	32.5	0.34	927830
12.5	3733063	2397	8347406	7756	3622465	2342	292 18 20.9	5.8	0.39	927968
13.0	3813920	3253	8316914	7271	3609236	9117	292 48 54.2	39.0	0.44	928112
13.5	+3894485	3817	—8285777	6140	—3595725	5609	293 19 27.5	12.2	—0.48	928263
14.0	3974751	4082	8253995	4365	3581934	1822	293 49 60.7	45.3	0.52	928419
14.5	4054712	4042	8221570	1946	3567865	7756	294 20 33.9	18.4	0.55	928582
15.0	4134362	3701	8189506	8889	3553518	3413	294 50 67.0	51.4	0.57	928750
15.5	4213695	3023	8154806	5195	3538895	8794	295 21 40.1	24.5	0.58	928924
16.0	+4292704	2031	—8120470	0866	—3523996	3899	295 51 73.1	57.4	—0.59	929104
16.5	4371383	0710	8085500	5902	3508821	8728	296 22 46.1	30.3	0.59	929289
17.0	4449726	9052	8049900	30309	3493372	3283	296 53 18.9	3.0	0.59	929479
17.5	4527726	7052	8013671	4086	3477650	7565	297 23 51.7	35.8	0.58	929674
18.0	4605376	4741	7976818	7240	3461656	1575	297 54 24.4	8.3	0.56	929873
18.5	+4682671	1996	—7939342	9770	—3445390	5313	298 24 57.0	40.9	—0.53	930077
19.0	4759603	8927	7901245	1680	3428855	8782	298 55 29.5	13.2	0.50	930285
19.5	4836167	5491	7862531	2973	3412051	1982	299 25 62.0	45.6	0.46	930497
20.0	4912355	1678	7823203	3652	3394981	4916	299 56 34.2	17.7	0.41	930713
20.5	4988162	7485	7783264	3720	3377647	7586	300 26 66.3	49.8	0.36	930933
21.0	+5063581	2904	—7742718	3181	—3360049	9992	300 57 38.2	21.6	—0.30	931157
21.5	5138605	7928	7701567	2047	3342190	1637	301 27 70.0	53.3	0.24	931384
22.0	5213229	2552	7659814	30291	3324071	4023	301 58 41.6	24.8	0.17	931615
22.5	5287447	6770	7617463	7947	3305692	5648	302 28 73.0	56.1	0.10	931850
23.0	5361254	0578	7574519	5010	3287055	7016	302 59 44.2	27.2	—0.03	932089
23.5	+5434643	3967	—7530984	1482	—3268161	8126	303 29 75.2	58.1	+0.03	932332
24.0	5507608	6933	7486863	7368	3249011	8981	304 0 46.0	28.8	0.10	932579
24.5	5580143	9468	7442161	2673	3229608	9582	304 30 76.5	59.3	0.17	932830
25.0	5652242	1568	7396881	7400	3209954	9933	305 1 46.8	29.5	0.24	933084
25.5	5723900	3227	7351027	1553	3190050	0033	305 31 76.8	59.5	0.30	933343
26.0	+5795109	4437	—7304602	5135	—3169897	9885	306 2 46.6	29.3	+0.36	933605
26.5	5865865	5194	7257608	8148	3149499	9491	306 32 76.1	58.6	0.41	933871
27.0	5936162	5493	7210053	0601	3128858	8855	307 3 45.3	27.7	0.46	934141
27.5	6005995	5325	7161939	2494	3107975	7977	307 33 74.2	56.5	0.50	934415
28.0	6075359	4693	7113270	3833	3086853	6859	308 4 42.7	24.9	0.54	934693
28.5	+6144248	3583	—7064051	4621	—3065493	5503	308 34 71.0	53.1	+0.57	934976
29.0	6212657	1994	7014289	4867	3043898	3913	309 5 38.8	20.8	0.59	935262
29.5	6280583	9921	6963985	4570	3022068	2087	309 35 66.4	48.4	0.60	935553
30.0	6348021	7361	6913145	3737	3000006	0030	310 6 33.6	15.5	0.61	935850
30.5	6414965	4307	6861773	2372	2977714	7742	310 36 60.5	42.5	0.60	936152
31.0	+6481410	0754	—6809874	30480	—2955192	5225	311 7 27.1	8.9	+0.60	936459

NOTE. — The accented letters correspond to the mean equinox and equator of January 0d.0.



# SUN'S COÖRDINATES, 1860. 381

Date, 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .	
Jan. 31.5	+6547352	6698	—6757453	8066	—2932444	2481	311 37 53.4	35.1	+0.59	936771	
Feb. 1.0	.6612785	2134	.6704512	5132	.2909470	9512	312 8 12.3	0.8	0.57	937089	
1.5	.6677706	7057	.6651055	1682	.2886274	6320	312 38 44.8	26.3	0.53	937412	
2.0	.6742109	1464	.6597089	7723	.2862857	2908	313 8 69.9	51.3	0.49	937740	
2.5	.6805991	5349	.6542616	3257	.2839221	9276	313 39 34.8	16.2	0.45	938074	
3.0	+6869347	8708	—6487642	8290	—2815367	5427	314 9 59.3	40.6	+0.40	938414	
3.5	.6932173	1537	.6432170	2825	.2791297	1361	314 40 23.4	4.7	0.35	938760	
4.0	.6994465	3832	.6376206	6868	.2767013	7082	315 10 47.2	28.4	0.29	939111	
4.5	.7056219	5589	.6319754	0423	.2742516	2589	315 40 70.7	51.9	0.23	939469	
5.0	.7117430	6803	.6262818	3495	.2717810	7888	316 11 33.8	14.9	0.17	939832	
5.5	+7178095	7471	—6205401	6063	—2692896	2978	316 41 56.6	37.7	+0.11	940201	
6.0	.7238209	7589	.6147508	8197	.2667777	7864	317 12 19.1	0.0	+0.04	940576	
6.5	.7297767	7151	.6089145	9840	.2642454	2545	317 42 41.3	22.1	—0.02	940957	
7.0	.7356766	6154	.6030314	1016	.2616930	7026	318 12 63.1	43.8	0.09	941344	
7.5	.7415202	4504	.5971019	1727	.2591203	1303	318 43 24.7	5.4	0.15	941738	
8.0	+7473071	2467	—5911266	1981	—2565277	5383	319 13 45.9	26.5	—0.21	942137	
8.5	.7530370	9770	.5851059	1780	.2539153	9262	319 43 66.9	47.5	0.27	942542	
9.0	.7587093	6497	.5790404	1132	.2513833	2946	320 14 27.5	8.0	0.32	942953	
9.5	.7643237	2645	.5729304	0038	.2486320	6440	320 44 47.9	28.4	0.36	943370	
10.0	.7698797	8209	.5667765	8506	.2459616	9741	321 14 67.9	48.3	0.40	943792	
10.5	+7753769	8185	—5606790	6537	—2432722	2851	321 45 27.7	8.0	—0.44	944220	
11.0	.7808149	7570	.5543383	4137	.2405640	5774	322 15 47.1	27.3	0.47	944652	
11.5	.7861932	1358	.5480548	1308	.2378373	8511	322 45 66.3	46.4	0.48	945089	
12.0	.7915114	4545	.5417291	8058	.2350923	1066	323 16 25.1	5.1	0.49	945531	
12.5	.7967690	7126	.5353615	4388	.2323290	3437	323 46 43.7	23.7	0.48	945978	
13.0	+8019657	9098	—5289526	0305	—2295478	5630	324 16 62.0	41.8	—0.48	946429	
13.5	.8071012	0458	.5225027	5812	.2267488	7645	324 46 80.0	59.9	0.46	946884	
14.0	.8121750	1201	.5160123	0914	.2239322	9484	325 17 37.6	17.4	0.45	947343	
14.5	.8171866	1322	.5094820	5612	.2210982	1149	325 47 55.0	34.9	0.42	947805	
15.0	.8221357	0818	.5029123	9926	.2182470	2642	326 17 72.1	51.8	0.39	948271	
15.5	+8270219	9685	—4963037	3846	—2153789	3965	326 48 28.9	8.5	—0.35	948740	
16.0	.8318448	7920	.4896568	7383	.2124942	5123	327 18 45.3	24.8	0.30	949213	
16.5	.8366039	5517	.4829721	0542	.2095929	6114	327 48 61.5	41.8	0.25	949689	
17.0	.8412990	2474	.4762499	3326	.2066755	6945	328 18 77.3	56.7	0.19	950167	
17.5	.8459296	8786	.4694908	5741	.2037420	7615	328 49 32.8	12.1	0.13	950648	
18.0	+8504953	4449	—4626954	7793	—2007928	8128	329 19 47.9	27.2	—0.07	951132	
18.5	.8549958	9460	.4558643	9487	.1978281	8486	329 49 62.7	41.9	—0.01	951619	
19.0	.8594308	3816	.4489980	0830	.1948479	8689	330 19 77.1	56.3	+0.06	952108	
19.5	.8637999	7513	.4420971	1826	.1918529	8744	330 50 31.2	10.3	0.13	952599	
20.0	.8681025	0545	.4351622	2483	.1888431	8651	331 20 44.8	23.9	0.20	953092	
20.5	+8273383	2909	—4281940	2806	—1858187	8411	331 50 58.1	37.1	+0.27	953587	
21.0	.8765070	4603	.4211928	2800	.1827801	8030	332 20 70.9	49.9	0.34	954083	
21.5	.8806084	5623	.4141592	2469	.1797275	7508	332 51 23.3	2.1	0.40	954582	
22.0	.8846423	5969	.4070938	1821	.1766611	6849	333 21 35.3	14.1	0.46	955082	
22.5	.8886084	5636	.3999972	0860	.1735811	6054	333 51 46.8	25.5	0.52	955584	
23.0	+8925063	4622	—3928699	9593	—1704879	5127	334 21 57.9	36.6	+0.57	956088	
23.5	.8963358	2924	.3857128	8027	.1673817	4070	334 51 68.5	47.1	0.61	956594	
24.0	.9000966	0539	.3785262	6167	.1642629	2887	335 21 78.7	57.3	0.65	957102	
24.5	.9037884	7464	.3713109	4019	.1611815	1578	335 52 28.5	7.1	0.68	957612	
25.0	.9074110	3697	.3640674	1589	.1579879	0147	336 22 37.7	16.2	0.71	958125	
25.5	+9109642	9236	—3567963	8883	—1548324	8596	336 52 46.5	24.9	+0.72	958640	
26.0	.9144477	4079	.3494983	5908	.1516653	6930	337 22 54.7	33.0	0.73	959156	
26.5	.9178612	8221	.3421738	2668	.1484868	5149	337 52 62.4	40.7	0.73	959675	
27.0	.9212044	1661	.3348234	9169	.1452972	3258	338 22 69.6	47.8	0.72	960195	
27.5	.9244772	4396	.3274480	5420	.1420967	1257	338 52 76.3	54.5	0.70	960718	
28.0	+9276796	6428	—3200481	1426	—1388856	9151	339 23 22.5	0.6	+0.68	961243	
28.5	.9308113	7752	.3126242	7192	.1356641	6940	339 53 28.2	6.2	0.65	961771	
29.0	.9338792	8369	.3061770	2725	.1324325	4629	340 23 33.3	11.3	0.62	962302	
29.5	.9368622	8277	.2977069	8029	.1291909	2217	340 53 37.9	15.8	0.58	962836	
Mar. 1.0	.9397811	7474	.2902146	3111	.1259398	9711	341 23 41.9	19.8	0.54	963373	
1.5	+9426287	5958	—2827008	7978	—1226791	7108	341 53 45.5	23.3	+0.49	963913	



# 382 SUN'S COÖRDINATES, 1860.

Date, 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Mar. 2.0	+9454049	3728	-2751658	2633	-1194095	4417	342 23 48.4	26.1	+0.43	9.9
2.5	9481094	0781	2676103	7083	1161810	1636	342 53 51.0	28.6	0.37	964456
3.0	9507422	7117	2600348	1332	1128439	8770	343 23 52.9	30.5	0.31	965003
3.5	9533031	2734	2524398	5386	1095483	5818	343 53 54.4	31.9	0.25	965553
4.0	9557920	7631	2448261	9254	1062446	2786	344 23 55.3	32.8	0.18	966107
4.5	+9582088	1807	-2371942	2939	-1029329	9672	344 53 55.7	33.1	0.12	966664
5.0	9605533	5261	2295445	6446	0996136	6485	345 23 55.6	33.0	+0.05	967225
5.5	9628255	7991	2218778	9783	0962869	3222	345 53 55.0	32.3	-0.01	967790
6.0	9650253	9998	2141945	2952	0929530	9886	346 23 53.9	31.2	0.07	968359
6.5	9671526	1279	2164952	5963	0896120	6482	346 53 52.3	29.5	0.13	968931
7.0	+9692073	1835	-1987803	8817	-0862643	3010	347 23 50.3	27.5	0.18	969507
7.5	9711892	1662	1910505	1522	0829100	9471	347 53 47.8	24.9	0.23	970086
8.0	9730982	0761	1833063	4083	0795495	5871	348 23 44.8	21.9	0.27	970669
8.5	9749342	9130	1756481	6504	0761829	2209	348 53 41.4	18.4	0.31	971255
9.0	9766970	6767	1677766	8792	0728106	8490	349 23 37.5	14.5	0.34	971845
9.5	+9783866	3672	-1599924	0953	-0694326	4714	349 53 33.1	10.0	0.35	972438
10.0	9800028	9843	1521960	2992	0660494	0886	350 23 28.3	5.2	0.36	973034
10.5	9815455	5279	1443881	4916	0626610	7006	350 53 83.0	59.8	0.37	973634
11.0	9830146	9979	1365690	6727	0592679	3079	351 23 77.3	54.1	0.37	974237
11.5	9844100	3942	1287893	8432	0558701	9105	351 52 71.2	47.9	0.36	974842
12.0	+9857316	7167	-1208998	0039	-0524679	5067	352 22 64.8	41.2	0.34	975451
12.5	9869794	9654	1130508	1551	0490616	1028	352 52 57.6	34.1	0.32	976061
13.0	9881531	1401	1051932	2977	0456515	6931	353 22 50.2	26.7	0.29	976674
13.5	9892527	2406	0973275	4322	0422879	2799	353 52 42.3	18.7	0.25	977289
14.0	9902780	2669	0894540	5589	0388209	8633	354 22 34.0	10.4	0.21	977906
14.5	+9912290	2188	-0815733	6786	-0354007	4435	354 52 25.3	1.6	0.16	978524
15.0	9921056	0964	0736864	7917	0319777	0208	355 22 17.1	52.4	0.11	979144
15.5	9929078	8995	0657933	8987	0285521	5956	355 51 66.6	42.8	-0.05	979765
16.0	9936354	6281	0578948	0004	0251242	1680	356 20 56.6	32.8	+0.02	980388
16.5	9942882	2819	0499916	0973	0216941	7363	356 51 46.2	22.3	0.09	981012
17.0	+9948663	8610	-0420844	1903	-0182623	3068	357 20 35.3	11.4	0.16	981636
17.5	9953698	3655	0341736	2796	0148289	8738	357 51 24.0	0.0	0.23	982260
18.0	9957985	7952	0262600	3662	0113941	4393	358 20 72.2	48.2	0.30	982885
18.5	9961525	1502	0183442	4505	0079685	0041	358 50 60.0	36.0	0.37	983509
19.0	9964316	4303	0104268	5333	0045223	5682	359 20 47.4	23.3	0.44	984134
19.5	+9966359	6356	-0025085	6151	-0010857	1320	359 50 34.4	10.2	0.51	984758
20.0	9967634	7661	+0054101	3033	+0023509	3043	0 19 80.8	56.5	0.57	985382
20.5	9968201	8218	0133285	2216	0057873	7404	0 19 66.7	42.4	0.62	986006
21.0	9968000	8027	0212460	1390	0092234	1762	1 19 52.0	27.7	0.67	986629
21.5	9967051	7088	0291620	0549	0126589	6113	1 49 36.9	12.5	0.71	987252
22.0	+9965354	5402	+0370759	9687	+0160934	0455	2 18 81.2	56.8	0.75	987874
22.5	9962909	2967	0449869	8796	0195267	4784	2 48 65.1	40.6	0.79	988495
23.0	9959717	9786	0526943	7869	0229583	9097	3 18 48.4	23.9	0.82	988915
23.5	9955778	5858	0607976	6901	0263882	3393	3 48 31.2	6.6	0.83	989734
24.0	9951095	1185	0686962	5886	0298159	7667	4 17 73.4	48.6	0.84	990352
24.5	+9945667	5768	+0765896	4819	+0332414	1919	4 47 55.1	30.4	0.84	990970
25.0	9939495	9606	0844769	3691	0366642	6144	5 17 36.2	11.5	0.84	991587
25.5	9932581	2702	0923579	2500	0400642	0341	5 46 76.8	52.0	0.83	992203
26.0	9924926	5058	1002316	1235	0435009	4505	6 16 56.8	32.0	0.81	992818
26.5	9916532	6674	1080975	9894	0469143	8636	6 46 36.3	11.4	0.78	993433
27.0	+9907400	7533	+1159552	8471	+0503241	2731	7 15 75.1	50.2	0.75	994047
27.5	9897532	7695	1238041	6960	0537299	6786	7 45 53.5	28.5	0.71	994660
28.0	9886929	7103	1316433	5351	0571817	0801	8 15 31.2	6.2	0.66	995273
28.5	9875592	5776	1394723	3641	0605291	4772	8 44 68.3	43.2	0.60	995886
29.0	9863523	3718	1472905	1923	0639216	8695	9 14 44.8	19.7	0.54	996499
29.5	+9850724	0930	+1550973	9891	+0672022	2568	9 43 80.7	55.5	0.48	997112
30.0	9837195	7412	1628923	7841	0706916	6390	10 13 56.0	30.8	0.42	997725
30.5	9822940	3168	1706749	5667	0740686	0157	10 43 30.8	5.5	0.36	998338
31.0	9807959	8198	1784447	3365	0774399	3868	11 12 64.9	39.6	0.30	998952
31.5	9792255	2504	1862010	0929	0808055	7521	11 42 38.6	13.2	0.23	999565
Apr. 1.0	+9775829	6089	+1939433	8353	+0841649	1113	12 11 71.6	46.2	+0.17	000189
										000794

The first figures of this and the following logarithms are 0.0.



# SUN'S COÖRDINATES, 1860. 383

Date, 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .	
Apr. 1.5 2.0 2.5 3.0 3.5  4.0 4.5 5.0 5.5 6.0	+9758683	8954	+3016709	5630	+0875181	4642	12 41 44.1	18.6	+0.12	001410	
	9740820	1102	2093835	2757	0908647	8106	13 10 76.0	50.5	+0.06	002026	
	9722240	2533	3170804	9727	0942046	1503	13 40 47.4	21.8	0.00	00:642	
	9702946	3250	3247612	6336	0975375	4830	14 9 78.2	52.6	-0.05	003260	
	9682939	3254	3324253	3178	1006632	8087	14 39 48.5	22.8	0.10	003878	
	+9662222	3548	+2400722	9648	+1041814	1265	15 8 78.2	52.5	0.14	004498	
	9640797	1134	3477013	5940	1074921	4370	15 38 47.5	21.7	0.18	005118	
	9618665	9013	3553122	2050	1107947	7394	16 7 76.1	50.3	0.21	005740	
	9595829	6188	3629044	7973	1140892	0337	16 37 44.3	18.4	0.23	006363	
	9572291	2661	3704774	3704	1173755	3198	17 6 71.9	46.0	0.25	006987	
	6.5 7.0 7.5 8.0 8.5  9.0 9.5 10.0 10.5 11.0	+9548058	8433	+2780307	9238	+1206533	5974	17 36 39.1	13.1	0.26	007612
		9523114	3506	2855637	4570	1239223	8662	18 5 65.8	39.8	0.26	008237
		9497478	7881	2930759	9693	1271823	1360	18 35 32.0	5.9	0.25	008863
		9471147	1561	3005669	4605	1304331	3766	19 4 57.8	31.7	0.24	009489
		9444121	4536	3080659	9296	1336745	6178	19 33 83.0	56.8	0.22	010116
		+9416404	6840	+3154827	3766	+1369062	8494	20 3 47.9	21.7	0.20	010742
9387996		8443	3229066	8006	1401281	0711	20 32 72.3	46.0	0.17	011369	
9358900		9359	3303073	2015	1433398	2827	21 2 36.3	9.9	0.13	011995	
9329117		9587	3376841	5785	1465412	4839	21 31 59.9	33.4	0.08	012621	
9298651		9132	3450865	9311	1497320	6746	22 0 83.0	56.5	-0.03	013247	
11.5 12.0 12.5 13.0 13.5  14.0 14.5 15.0 15.5 16.0		+9267504	7996	+3523638	2586	+1529121	8545	22 30 45.7	19.1	+0.08	013872
		9235677	6180	3596656	5806	1560812	0235	22 59 67.9	41.3	0.09	014496
		9203173	3687	3669413	8365	1592390	1812	23 29 29.7	3.0	0.16	015120
		9169994	0520	3741905	0859	1623852	3273	23 58 51.0	24.3	0.23	015742
		9136142	6679	3814127	3083	1655197	4617	24 27 71.9	45.1	0.30	016363
		+9101619	3168	+3886073	5032	+1686421	5640	24 57 32.3	5.5	0.37	016981
	9066429	6989	3957738	6699	1717523	6941	25 26 52.4	25.5	0.44	017598	
	9030574	1146	4029116	8080	1748501	7918	25 55 72.0	45.0	0.50	018213	
	8994055	4638	4100201	9168	1779352	8768	26 25 31.2	4.1	0.56	018826	
	8956875	7470	4170989	9959	1810075	9490	26 54 50.0	22.9	0.62	019437	
	16.5 17.0 17.5 18.0 18.5  19.0 19.5 20.0 20.5 21.0	+8919038	9644	+4241475	0448	+1840666	0080	27 23 68.4	41.2	0.68	020046
		8880546	1164	4311654	0630	1871123	0537	27 52 86.4	59.2	0.73	020651
		8841402	2031	4381520	0499	1901444	0857	28 22 44.0	16.7	0.78	021254
		8801609	2250	4451065	0047	1931626	1039	28 51 61.1	33.8	0.82	021853
		8761170	1822	4520286	9271	1961668	1080	29 20 77.8	50.4	0.86	022450
		+8720089	0753	+4589177	8165	+1991565	0977	29 50 34.0	6.5	0.89	023043
8678369		9045	4657732	6723	2021317	0728	30 19 49.7	22.1	0.91	023633	
8636014		6702	4725947	4942	2050921	0332	30 48 65.0	37.3	0.93	024219	
8593027		3726	4793816	2805	2080374	9784	31 17 79.7	51.9	0.94	024803	
8549413		0124	4861336	0337	2109675	9085	31 47 34.0	6.2	0.94	025382	
21.5 22.0 22.5 23.0 23.5  24.0 24.5 25.0 25.5 26.0		+8505174	5896	+4928499	7505	+2138821	8231	32 16 47.8	19.9	0.93	025959
		8460314	1048	4995300	4309	2167809	7219	32 45 61.1	33.2	0.92	026531
		8414836	5581	5061735	0748	2196637	6047	33 14 74.0	46.0	0.90	027101
		8368745	9502	5127798	6815	2225304	4714	33 43 86.3	58.3	0.87	027666
		8322045	2814	5193486	2507	2253807	3217	34 13 38.2	10.1	0.83	028228
		+8274741	5522	+5258793	7818	+2282144	1554	34 42 49.4	21.3	0.79	028786
	8226836	7629	5323716	2746	2310314	9724	35 11 60.3	32.1	0.74	029341	
	8178335	9140	5388249	7284	2338315	7725	35 40 70.5	42.2	0.68	029893	
	8129241	0055	5452388	1428	2366145	5555	36 9 80.3	51.9	0.62	030442	
	8079559	0387	5516129	5173	2393802	3213	36 39 29.5	1.1	0.56	030988	
	26.5 27.0 27.5 28.0 28.5  29.0 29.5 30.0 30.5 May 1.0 1.5	+8029293	0132	+5579468	8517	+3421284	0695	37 8 38.3	9.8	0.50	031531
		7978447	9298	5642400	1453	2448590	8002	37 37 46.5	18.0	0.43	032072
		7927026	7888	5704921	3979	2475718	5130	38 6 54.2	25.6	0.37	032610
		7875035	5909	5767026	6089	2502665	2078	38 35 61.4	32.8	0.30	033146
		7822478	3364	5828712	7780	2529430	8843	39 4 68.0	39.3	0.23	033680
		+7769359	0257	+5889974	9047	+2556011	5425	39 33 74.2	45.5	0.17	034211
7715681		6591	5950807	9885	2582407	1821	40 2 79.9	50.9	0.11	034740	
7661450		2372	6011208	0291	2608616	8031	40 31 85.1	56.1	0.06	035267	
7606668		7602	6071174	0262	2634636	4052	41 1 29.8	0.7	+0.01	035792	
7551343		2289	6130701	9795	2660465	9882	41 30 34.0	4.9	-0.04	036315	
+7495476		6433	+6189787	8886	+2686104	5522	41 59 37.7	8.5	-0.08	036837	



# 384 SUN'S COÖRDINATES, 1860.

Date, 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
May 2.0	+7439073	0042	+6248426	7531	+2711549	0968	42 28 41.0	11.8	—0.12	0.0
2.5	7382137	3117	6306616	5726	2736799	6219	42 57 43.8	14.5	0.15	037857
3.0	7324672	5664	6364352	3468	2761852	1273	43 26 46.2	16.9	0.17	038392
3.5	7266684	7687	6421631	0752	2786708	6130	43 55 48.1	18.7	0.18	038907
4.0	7208177	9192	6478449	7576	2811363	0787	44 24 49.6	20.1	0.19	039420
4.5	+7149155	0181	+6534803	3935	+2835817	5242	44 53 50.6	21.0	0.19	039932
5.0	7089621	0659	6590689	9827	2860069	9496	45 22 51.2	21.5	0.18	040442
5.5	7029580	0629	6646104	5248	2884115	3543	45 51 51.4	21.6	0.17	040952
6.0	6969035	0096	6701042	0192	2907958	7388	46 20 51.2	21.4	0.15	041459
6.5	6907991	9063	6755502	4658	2931592	1023	46 49 50.7	20.9	0.11	041966
7.0	+6846452	7536	+6809479	8641	+2955018	4451	47 18 49.8	19.8	0.07	042470
7.5	6784421	5516	6862970	2138	2978233	7667	47 47 48.5	18.5	—0.03	042973
8.0	6721904	3011	6915972	5147	3001235	0672	48 16 46.8	16.7	+0.02	043473
8.5	6658904	0022	6968482	7663	3024024	3462	48 45 44.8	14.7	0.08	043971
9.0	6595426	6555	7020496	9684	3046598	6039	49 14 42.5	12.2	0.14	044467
9.5	+6531475	2615	+7072010	1204	+3068956	8399	49 43 39.9	9.5	0.20	044961
10.0	6467055	8206	7123019	2220	3091096	0541	50 12 36.8	6.3	0.27	045452
10.5	6402170	3332	7173521	2729	3113016	2463	50 41 33.5	3.0	0.33	045941
11.0	6336825	7998	7223513	2728	3134713	4162	51 9 89.8	59.2	0.40	046426
11.5	6271023	2207	7272991	2213	3156187	5638	51 39 85.9	55.3	0.47	046909
12.0	+6204769	5964	+7321951	1180	+3177437	6890	52 7 81.6	50.9	0.53	047388
12.5	6138068	9274	7370390	9626	3198460	7915	52 36 77.1	46.3	0.60	047865
13.0	6070924	2141	7418303	7546	3219254	8712	53 5 72.2	41.3	0.66	048337
13.5	6003342	4569	7465686	4936	3239819	9279	53 34 67.1	36.1	0.72	048806
14.0	5935328	6566	7512537	1795	3260153	9616	54 3 61.7	30.5	0.77	049271
14.5	+5866885	8133	+7558851	8116	+3280253	9718	54 32 56.0	24.8	0.82	049732
15.0	5798017	9276	7604625	3898	3300119	9587	55 1 49.9	18.6	0.86	050188
15.5	5728731	9997	7649856	9137	3319748	9218	55 30 43.6	12.3	0.90	050639
16.0	5659032	0311	7694540	3829	3339141	8614	55 59 37.0	5.6	0.93	051086
16.5	5588924	0213	7738674	7971	3358293	7768	56 27 90.1	58.7	0.95	051528
17.0	+5518412	9712	+7782255	1560	+3377205	6683	56 56 82.9	51.4	0.97	051965
17.5	5447503	8814	7825279	4592	3395875	5355	57 25 75.5	43.9	0.98	052397
18.0	5376202	7524	7867743	7064	3414302	3785	57 54 67.7	35.9	0.98	052823
18.5	5304515	5847	7909643	8973	3432484	1970	58 23 59.6	27.8	0.97	053244
19.0	5232447	3789	7950976	0314	3450420	9909	58 52 51.1	19.2	0.95	053660
19.5	+5160004	1356	+7991739	1086	+3468108	7600	59 21 42.4	10.4	0.93	054071
20.0	5087191	8553	8031927	1282	3485547	5042	59 50 33.2	1.1	0.91	054476
20.5	5014014	5386	8071539	0903	3502736	2234	60 18 83.8	51.6	0.87	054875
21.0	4940479	1861	8110572	0945	3519672	9173	60 47 74.0	41.8	0.83	055268
21.5	4866591	7983	8149025	8407	3536355	5859	61 16 64.0	31.7	0.79	055656
22.0	+4792355	3757	+8186896	6287	+3552785	2293	61 45 53.5	21.2	0.75	056039
22.5	4717779	9191	8224183	3583	3568961	8472	62 14 42.8	10.4	0.69	056416
23.0	4642867	4289	8260879	0288	3584880	4395	62 42 91.6	59.1	0.63	056788
23.5	4567625	9057	8296983	6402	3600542	0061	63 11 80.2	47.6	0.57	057156
24.0	4492060	3502	8332493	1921	3615948	5470	63 40 68.3	35.6	0.50	057518
24.5	+4416177	6629	+8367408	6846	+3631097	0623	64 9 56.2	23.4	0.43	057875
25.0	4339983	1444	8401725	1172	3645985	5514	64 38 43.6	10.7	0.36	058226
25.5	4263483	4954	8435442	4899	3660613	0146	65 6 90.8	57.8	0.29	058573
26.0	4186683	8163	8468556	8023	3674980	4517	65 35 77.5	44.5	0.23	058915
26.5	4109588	1078	8501067	0544	3689086	8627	66 4 64.0	30.9	0.17	059253
27.0	+4032205	3704	+8532973	2460	+3702929	2474	66 33 50.1	16.9	0.11	059586
27.5	3954539	6048	8564271	3768	3716507	6056	67 2 35.8	2.5	+0.05	059915
28.0	3876596	8114	8594961	4468	3729821	9374	67 30 81.2	47.8	0.00	060240
28.5	3798382	9910	8625040	4557	3742871	2428	67 59 66.3	32.8	—0.04	060561
29.0	3719903	1440	8654507	4034	3755655	5216	68 28 51.0	17.4	0.08	060877
29.5	+3641165	2712	+8683361	2898	+3768173	7738	68 57 35.5	1.8	0.12	061190
30.0	3562172	3728	8711599	1147	3780426	9996	69 25 79.6	45.8	0.15	061499
30.5	3582930	4495	8739221	8780	3792411	1985	69 54 63.4	29.5	0.16	061805
31.0	3403445	5019	8766225	5795	3804127	3706	70 23 46.9	13.0	0.17	062107
31.5	3323721	5304	8792608	2189	3815575	5158	70 51 90.1	56.1	0.17	062407
June 1.0	+3243766	5358	+8818371	7963	+3826754	6342	71 20 73.0	38.9	—0.17	062703



# SUN'S COORDINATES. 1860. 385

Date, 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .	
June	1.5	+3163584	5185	+8843510	3113	+3837664	7256	71 49 55.6	21.4	-0.15	062997
	2.0	3083180	4790	8868027	7641	3848303	7900	72 18 38.0	3.7	0.14	063287
	2.5	3002561	4180	8891917	1542	3858672	8274	72 46 80.1	45.7	0.12	063574
	3.0	2921730	3358	8915181	4817	3868770	8377	73 15 62.0	27.5	0.09	063858
	3.5	2840693	2330	8937817	7464	3878596	8208	73 44 43.7	9.1	-0.05	064138
	4.0	+2759457	1102	+8959824	9482	+3888149	7766	74 12 85.1	50.4	0.00	064415
	4.5	2678027	9681	8981202	0872	3897428	7050	74 41 66.4	31.6	+0.05	064689
	5.0	2596408	8070	9001947	1629	3906433	6060	75 10 47.4	12.6	0.11	064959
	5.5	2514605	6275	9022060	1754	3915164	4796	75 38 88.3	53.4	0.17	065226
	6.0	2432623	4301	9041538	1244	3923620	3257	76 7 68.9	33.9	0.24	065490
	6.5	+2350468	2154	+9060381	1099	+3931798	1440	76 36 49.5	14.4	0.30	065751
	7.0	2268146	9840	9078587	8317	3939701	9348	77 4 89.8	54.5	0.36	066009
	7.5	2185661	7363	9096155	5897	3947327	6979	77 33 70.0	34.7	0.43	066263
	8.0	2103018	4728	9113082	2836	3954675	4333	78 2 50.0	14.6	0.49	066513
	8.5	2020223	1941	9129368	9135	3961746	1409	78 30 90.0	54.5	0.55	066759
	9.0	+1937282	9007	+9145011	4790	+3968537	8206	78 59 69.8	34.2	0.61	067001
	9.5	1854201	5933	9160010	9802	3975049	4723	79 28 49.6	14.0	0.67	067239
	10.0	1770986	2725	9174364	4169	3981281	0961	79 56 89.2	53.5	0.73	067472
10.5	1687642	9388	9189072	7890	3987232	6917	80 25 68.8	33.0	0.78	067701	
11.0	1604174	5927	9201131	0962	3992901	2592	80 54 48.2	12.3	0.82	067925	
11.5	+1520590	1350	+9213542	3386	+3998288	7984	81 22 87.6	51.6	0.86	068144	
12.0	1436894	8660	9225302	5159	4003393	3095	81 51 66.8	30.6	0.89	068358	
12.5	1353093	4866	9236411	6281	4008215	7922	82 20 45.9	9.7	0.91	068567	
13.0	1269193	0972	9246867	6750	4012753	2466	82 48 84.9	48.5	0.93	068770	
13.5	1185199	6984	9256670	6566	4017007	6726	83 17 63.9	27.5	0.93	068968	
14.0	+1101119	2910	+9265818	5727	+4020976	0701	83 46 42.7	6.1	0.93	069160	
14.5	1016958	9755	9274311	4234	4024661	4392	84 14 81.5	44.9	0.92	069346	
15.0	0932723	4526	9282146	2082	4028060	7797	84 43 60.1	23.4	0.91	069526	
15.5	0848419	0228	9289324	9274	4031174	0907	85 12 38.7	2.0	0.90	069699	
16.0	0764053	5867	9295844	5807	4034002	3751	85 40 77.2	40.8	0.88	069866	
16.5	+0679630	1450	+9301706	1683	+4036544	6299	86 9 55.7	18.7	0.84	070027	
17.0	0595158	6983	9306910	6900	4038799	8560	86 37 94.0	56.9	0.80	070181	
17.5	0510642	2473	9311456	1460	4040768	0535	87 6 72.3	35.1	0.75	070329	
18.0	0426087	7923	9315341	5358	4042450	2223	87 35 50.4	13.1	0.70	070471	
18.5	0341502	3343	9318565	8596	4043846	3625	88 3 88.5	51.1	0.64	070606	
19.0	+0256893	8738	+9321127	1171	+4044955	4741	88 32 66.4	28.9	0.58	070735	
19.5	0172266	4116	9323029	3087	4045777	5569	89 1 44.3	6.7	0.52	070857	
20.0	0087629	9483	9324270	4342	4046313	6112	89 29 81.9	44.3	0.45	070973	
20.5	+0002988	4847	+9324851	4937	+4046562	6367	89 58 59.5	21.8	0.39	071082	
21.0	-0081651	9788	-9324772	4872	-4046525	6337	90 26 96.9	59.1	0.32	071185	
21.5	-0166282	4414	-9324033	4147	-4046201	6019	90 55 74.2	36.3	0.25	071282	
22.0	0250897	9025	9322635	2763	4045591	5416	91 24 51.3	13.3	0.18	071373	
22.5	0335491	3614	9320579	0721	4044694	4525	91 52 88.4	50.3	0.12	071457	
23.0	0420059	8178	9317865	8021	4043511	3349	92 21 65.3	27.0	+0.05	071535	
23.5	0504594	2709	9314493	4663	4042043	1887	92 50 42.1	3.8	-0.01	071607	
24.0	-0589089	7201	-9310464	0649	-4040290	0141	93 18 78.7	40.2	0.06	071673	
24.5	0673538	1646	9305778	5978	4038253	8110	93 47 55.2	16.7	0.11	071735	
25.0	0757936	6041	9300435	0650	4035932	5796	94 15 91.5	53.0	0.16	071791	
25.5	0842277	0378	9294437	4667	4033327	3197	94 44 67.8	29.2	0.19	071842	
26.0	0926554	4652	9287785	8030	4030439	0316	95 13 43.9	5.2	0.22	071887	
26.5	-1010763	3858	-9280479	0739	-4027266	7150	95 41 80.0	41.2	0.24	071928	
27.0	1094897	2989	9272520	2797	4023811	3702	96 10 55.9	17.0	0.26	071963	
27.5	1178951	7041	9263910	4200	4020073	9971	96 38 91.7	52.7	0.27	071994	
28.0	1262918	1005	9254650	4955	4016055	5960	97 7 67.5	28.4	-0.27	072020	
28.5	1346793	4878	9244741	5061	4011754	1666	97 36 43.1	3.9	0.26	072042	
29.0	-1430571	8653	-9234183	4517	-4007178	7092	98 4 78.7	39.4	0.25	072060	
29.5	1514247	2327	9222977	3326	4002311	2237	98 33 54.2	14.8	0.23	072074	
30.0	1597813	5890	9211124	1489	3997170	7103	99 1 89.7	50.2	0.20	072083	
30.5	1681264	9339	9198627	9007	3991749	1689	99 30 65.1	25.5	0.16	072091	
July 1.0	1764595	2667	9185486	5882	3986050	5997	99 59 40.4	0.7	0.12	072099	
1.5	-1847800	5871	-9171702	2113	-3980071	0025	100 27 75.7	35.9	-0.07	072107	



# 386 SUN'S COÖRDINATES, 1860.

Date, 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
July 2.0	—1930874	8943	+9157277	7704	+3973816	3776	100 56	51.0	11.1	0.0
2.5	2013813	1881	9142211	2653	3967280	7246	101 24	86.3	46.3	—0.02
3.0	2096611	4678	9126506	6964	3960468	0443	101 53	61.6	21.5	+0.04
3.5	2179264	7331	9110163	0636	3953379	3361	102 21	96.9	56.7	0.10
4.0	2261765	9831	9093182	3671	3946014	6003	102 50	72.2	31.6	0.16
4.5	—2344109	2175	+9075565	6069	+3938379	8368	103 19	47.5	7.1	0.23
5.0	2426290	4357	9067311	7831	3930454	0457	103 47	82.8	42.3	0.29
5.5	2508303	6370	9038422	8957	3922260	2270	104 16	58.2	17.6	0.36
6.0	2590141	8209	9018899	9450	3913791	3808	104 44	93.7	63.0	0.42
6.5	2671798	9866	8998744	9310	3905048	5072	105 13	69.2	28.4	0.49
7.0	—2753271	1339	+8977958	8540	+3896031	6063	105 42	44.9	4.0	0.55
7.5	2834553	2621	8956541	7138	3886740	6779	106 10	80.7	39.6	0.60
8.0	2915640	3708	8934495	5108	3877176	7223	106 39	56.6	15.5	0.65
8.5	2996527	4595	8911821	2449	3867339	7393	107 7	92.6	51.4	0.70
9.0	3077208	5276	8888520	9164	3857229	7291	107 36	68.8	27.6	0.74
9.5	—3157677	5745	+8864592	5251	+3846847	6916	108 5	45.1	3.8	0.77
10.0	3237928	5997	8840039	0714	3836194	6271	108 36	81.5	40.1	0.79
10.5	3317954	6024	8814863	5553	3825269	5353	109 2	58.0	16.5	0.81
11.0	3397749	5821	8789065	9771	3814074	4166	109 30	94.7	53.1	0.82
11.5	3477308	5382	8762647	3368	3802609	2708	109 59	71.5	29.8	0.83
12.0	—3556625	4701	+8735609	6346	+3790875	0982	110 28	48.5	6.7	0.82
12.5	3635694	3772	8707953	8706	3778873	8987	110 56	85.6	43.7	0.81
13.0	3714509	2590	8679682	0451	3766604	6726	111 25	62.9	20.9	0.79
13.5	3793064	1147	8650797	1582	3754068	4197	111 53	100.3	58.3	0.77
14.0	3871355	9441	8621299	2100	3741265	1409	112 22	77.8	35.7	0.73
14.5	—3949375	7464	+8591190	2007	+3728197	8341	112 51	55.5	13.3	0.69
15.0	4027118	5210	8560471	1304	3714865	5017	113 19	93.3	51.0	0.65
15.5	4104579	2674	8529144	9993	3701269	1428	113 48	71.3	28.9	0.60
16.0	4181752	9850	8497213	8078	3687410	7577	114 17	49.5	6.9	0.54
16.5	4258630	6731	8464680	5561	3673289	3463	114 45	87.8	45.2	0.48
17.0	—4335207	3311	+8431546	2443	+3658908	9090	115 14	66.2	23.5	0.42
17.5	4411476	9583	8397814	8727	3644267	4456	115 43	44.8	2.0	0.35
18.0	4487430	5541	8363488	4417	3629367	9564	116 11	83.5	40.7	0.28
18.5	4563063	1178	8328569	9514	3614210	4414	116 40	62.3	19.5	0.21
19.0	4638372	6491	8293061	4021	3598797	9009	117 8	101.2	58.3	0.14
19.5	—4713351	1474	+8256964	7940	+3583129	3348	117 37	80.2	37.2	0.08
20.0	4787994	5121	8220284	1276	3567208	7435	118 6	59.4	16.3	+0.01
20.5	4862296	0427	8183023	4031	3551034	1268	118 34	98.6	55.4	—0.05
21.0	4936252	4387	8145180	6205	3534608	4850	119 3	78.0	34.7	0.11
21.5	5009856	7995	8106762	7802	3517933	8182	119 32	57.4	14.0	0.16
22.0	—5083106	1250	+8067768	8824	+3501009	1266	120 0	97.0	53.5	0.21
22.5	5155996	4145	8028204	9276	3483839	4103	120 29	76.7	33.1	0.25
23.0	5228519	6673	7988072	9159	3466423	6695	120 58	56.5	12.8	0.29
23.5	5300668	8827	7947376	8479	3448762	9042	121 26	96.5	52.7	0.32
24.0	5372438	0602	7906119	7237	3430858	1146	121 55	76.6	32.8	0.34
24.5	—5443823	1992	+7864304	5437	+3412713	3009	122 24	56.8	12.9	0.36
25.0	5514819	2994	7821935	3084	3394327	4630	122 52	97.3	53.2	0.37
25.5	5585423	3604	7779015	0180	3377002	6013	123 21	77.7	33.6	0.38
26.0	5655630	3817	7735548	6728	3356840	7158	123 50	58.3	14.1	0.37
26.5	5725435	3628	7691537	2733	3337742	8068	124 18	99.0	54.7	0.36
27.0	—5794832	3032	+7646985	8196	+3318410	8743	124 47	79.8	35.4	0.34
27.5	5863816	2023	7601895	3122	3298846	9185	125 16	60.7	16.2	0.31
28.0	5932333	0597	7556271	7513	3279050	9398	125 44	101.7	57.2	0.27
28.5	6000528	8750	7510119	1376	3259025	9380	126 13	82.9	38.3	0.23
29.0	6068247	6477	7463440	4712	3238771	9135	126 42	64.1	19.5	0.19
29.5	—6135535	3773	+7416239	7526	+3218290	8682	127 11	45.6	0.9	0.14
30.0	6202389	0636	7368516	9818	3197584	7963	127 39	87.2	42.4	0.08
30.5	6268804	7060	7320275	1593	3176654	7041	128 8	69.0	24.1	—0.02
31.0	6334776	3041	7271518	2850	3155500	5894	128 37	51.0	6.0	+0.04
31.5	6400301	8575	7222248	3593	3134125	4527	129 5	93.3	48.2	0.10
Aug. 1.0	—6465374	3657	+7172471	3833	+3112528	2937	129 34	75.7	30.5	0.16



**SUN'S COÖRDINATES, 1860. 387**

Date. 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $r$ .	
Aug. 1.5	—6529993	8285	+7122189	3566	+3090719	1129	130 3 58.5	13.2	+0.30	062475	
2.0	6594152	2453	7071406	2798	3068677	9101	130 31 101.4	56.1	0.36	062169	
2.5	6657848	6159	7020124	1531	3046425	6857	131 0 84.6	39.2	0.42	061861	
3.0	6721076	9397	6968347	9769	3023957	4397	131 29 68.1	22.7	0.48	061549	
3.5	6783832	2163	6916077	7514	3001275	1723	131 58 51.9	6.4	0.53	061234	
4.0	—6846110	4452	+6863317	4768	+3978889	8837	132 26 96.0	50.4	0.58	060916	
4.5	6907907	6259	6810071	1536	3955278	5741	132 55 80.4	34.7	0.63	060595	
5.0	6969218	7581	6756342	7821	3931964	2434	133 24 65.1	19.3	0.68	060271	
5.5	7030038	8412	6702133	3626	3908442	8920	133 53 50.1	4.2	0.71	059944	
6.0	7090368	8748	6647449	8956	3884714	5199	134 21 95.4	49.5	0.73	059614	
6.5	—7150189	3585	+6522291	3612	+3860781	1273	134 50 81.0	35.0	0.74	059280	
7.0	7209511	7919	6536666	8201	3836644	5143	135 19 67.0	21.0	0.75	058942	
7.5	7268234	6744	6480576	2125	3812305	2811	135 48 53.3	7.2	0.75	058601	
8.0	7326628	5055	6424024	5587	3787765	8278	136 16 99.9	53.8	0.74	058256	
8.5	7384405	2849	6367015	8592	3763025	3545	136 45 86.9	40.7	0.73	057907	
9.0	—7441664	0120	+6309550	1140	+3738087	8614	137 14 74.3	28.0	0.71	057554	
9.5	7498398	6866	6251633	3906	3712952	3486	137 43 62.0	15.6	0.67	057196	
10.0	7554599	3080	6193268	4884	3787623	8164	138 12 50.1	3.6	0.63	056834	
10.5	7610285	8761	6134459	6088	3662101	2649	138 40 98.6	52.0	0.58	056467	
11.0	7665392	3898	6073211	6853	3636888	6943	139 9 87.4	30.8	0.53	056096	
11.5	—7719973	8491	+6015526	7181	+3610485	1047	139 38 96.6	50.0	0.47	055720	
12.0	7774006	2537	5955410	7078	3584395	4964	140 7 66.2	19.5	0.41	055339	
12.5	7827486	8030	5894867	6548	3558119	8695	140 36 56.2	9.4	0.35	054953	
13.0	7880408	2866	5833901	5595	3531659	2242	141 4 106.5	59.7	0.29	054562	
13.5	7932768	1339	5772514	4221	3505016	5606	141 33 97.2	50.3	0.23	054166	
14.0	—7984561	8146	+5710713	2432	+3478198	8790	142 2 88.3	41.3	0.16	053765	
14.5	8035783	4381	5648501	2322	3451191	1795	142 31 79.7	32.6	0.10	053358	
15.0	8086439	5041	5585883	7626	3424013	4624	143 0 71.5	24.4	+0.03	052946	
15.5	8136496	5132	5522863	4618	3396662	7280	143 29 63.6	16.5	—0.04	052529	
16.0	8185979	4619	5459447	1214	3369139	9763	143 58 56.1	8.9	0.10	052106	
16.5	—8234874	3528	+5395638	7417	+3341447	2078	144 27 48.9	1.7	0.16	051678	
17.0	8283177	1845	5331443	3234	3313587	4224	144 55 102.0	54.7	0.22	051245	
17.5	8330885	9567	5266865	8668	3285561	6205	145 24 95.5	48.2	0.27	050807	
18.0	8377994	6691	5201912	3727	3257272	7922	145 53 89.3	41.9	0.32	050363	
18.5	8424500	3211	5136585	8411	3229020	9677	146 22 83.4	35.9	0.36	049918	
19.0	—8470400	9126	+5070891	3726	+3200510	1173	146 51 77.9	30.8	0.39	049460	
19.5	8515691	4432	5004834	6682	3171843	2513	147 20 72.7	24.8	0.42	049001	
20.0	8560369	9125	4938417	2976	3143021	3697	147 49 67.8	20.0	0.44	048538	
20.5	8604430	3201	4871648	3518	3114045	4728	148 18 63.2	15.4	0.45	048069	
21.0	8647872	6658	4804531	6412	3084919	5608	148 47 58.9	11.0	0.46	047597	
21.5	—8690691	9492	+4737073	8965	+3055645	6341	149 16 54.9	7.0	0.46	047190	
22.0	8732884	1700	4669277	1180	3026226	6928	149 45 51.2	3.2	0.45	046639	
22.5	8774449	3280	4601150	3064	1996663	7371	150 13 107.8	59.8	0.44	046154	
23.0	8815383	4230	4532695	4620	1966959	7673	150 42 104.8	56.7	0.42	045665	
23.5	8855683	4545	4463918	5853	1937115	7836	151 11 102.0	53.8	0.38	045178	
24.0	—8895345	4223	+4394824	6769	+1907133	7860	151 40 99.6	51.3	0.34	044677	
24.5	8934368	3262	4325418	7373	1877016	7750	152 9 97.5	49.2	0.30	044178	
25.0	8972748	1658	4255705	7670	1846766	7506	152 38 95.7	47.3	0.25	043676	
25.5	9010484	9410	4185690	7665	1816385	7132	153 7 94.2	45.8	0.19	043171	
26.0	9047579	6514	4115876	7861	1785877	6630	153 36 98.1	44.6	0.13	042664	
26.5	—9084011	2969	+4044774	6769	+1755242	6001	154 5 92.2	43.7	0.06	042154	
27.0	9119797	8772	3973885	5890	1724483	5248	154 34 91.7	43.1	—0.01	041643	
27.5	9154929	3921	3902713	4726	1693602	4373	155 3 91.6	43.0	+0.06	041129	
28.0	9189404	8413	3831264	3288	1662600	3377	155 32 91.8	43.1	0.12	040613	
28.5	9223221	2247	3759541	1574	1631479	2262	156 1 92.4	43.6	0.18	040095	
29.0	—9256376	5419	+3687552	9594	+1600243	1032	156 30 93.4	44.5	0.25	039576	
29.5	9288868	7928	3615300	7351	1568892	9687	156 59 94.8	45.9	0.32	039055	
30.0	9320694	9772	3542790	4850	1537429	8230	157 28 96.5	47.5	0.38	038533	
30.5	9351852	0948	3470026	2095	1506856	6663	157 57 98.7	49.6	0.44	038009	
31.0	9382340	1454	3397014	9092	1474174	4986	158 26 101.2	52.1	0.49	037484	
31.5	—9412156	1288	+3323759	5645	+1442387	3205	158 55 104.2	55.1	+0.53	036957	



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Date. 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .	
Sept. 1.0	—9441296	0447	+3250966	2361	+1410497	1520	159 24 107.6	58.4	+0.57	036420	
1.5	.9469760	8929	.3176538	8641	.1378805	9334	159 54 51.5	2.3	0.60	035900	
2.0	.9497543	6731	.3102583	4694	.1346414	7248	160 23 55.8	6.5	0.64	035369	
2.5	.9524645	3851	.3028403	—0522	.1314225	5064	160 52 60.7	11.4	0.65	034837	
3.0	.9551064	0289	.2954003	6129	.1281939	2783	161 21 65.9	16.5	0.66	034304	
3.5	—9576797	6040	+2879889	1523	+1249560	—0409	161 50 71.7	22.3	0.66	033769	
4.0	.9601840	1102	.2804565	6706	.1217090	7944	162 19 77.9	28.4	0.66	033233	
4.5	.9626193	5478	.2729536	1684	.1184530	5389	162 48 84.6	35.1	0.65	032695	
5.0	.9649853	9152	.2654308	8463	.1151884	2748	163 17 91.8	42.2	0.63	032155	
5.5	.9672818	2136	.2578885	1047	.1119152	—0021	163 46 95.9	49.9	0.60	031613	
6.0	—9695085	4423	+2503272	5441	+1086339	7213	164 15 107.8	56.1	0.57	031070	
6.5	.9716653	6010	.2427476	9652	.1053445	4324	164 45 56.5	6.8	0.53	031525	
7.0	.9737518	6895	.2351501	3683	.1020473	1357	165 14 65.8	16.0	0.49	029978	
7.5	.9757679	7075	.2275354	7542	.0987425	8313	165 43 75.6	25.7	0.44	029428	
8.0	.9777134	6550	.2199037	1231	.0954304	5197	166 12 85.9	35.9	0.39	028876	
8.5	—9795880	5316	+2122557	4757	+0921111	9008	166 41 96.7	46.7	0.33	028322	
9.0	.9813914	3370	.2045919	8125	.0887850	8752	167 10 108.1	58.0	0.27	027765	
9.5	.9831236	0712	.1969130	1342	.0854522	5429	167 40 60.0	9.9	0.21	027206	
10.0	.9847843	7339	.1892193	4410	.0821132	2043	168 9 72.5	22.3	0.14	026644	
10.5	.9863733	3249	.1815115	7338	.0787680	8596	168 38 85.5	35.3	0.08	026079	
11.0	—9878905	8441	+1737902	—0130	+0754170	5090	169 7 99.0	48.7	+0.01	025511	
11.5	.9893356	8912	.1660559	2792	.0720604	1529	169 37 53.0	2.7	—0.06	024940	
12.0	.9907085	6661	.1583093	5330	.0686984	7913	170 6 67.5	17.1	0.12	024366	
12.5	.9920090	9686	.1505509	7751	.0653813	4246	170 35 82.5	32.1	0.18	023789	
13.0	.9932370	1987	.1427813	—0059	.0619594	—0531	171 4 98.0	47.5	0.24	023208	
13.5	—9943923	3560	+1350012	2262	+0585828	6769	171 34 54.1	3.6	0.29	022624	
14.0	.9954748	4406	.1272111	4365	.0552020	2965	172 3 70.6	30.0	0.35	022037	
14.5	.9964844	4522	.1194115	6373	.0518170	9119	172 32 87.6	37.0	0.39	021447	
15.0	.9974210	3909	.1116031	8293	.0484233	5236	173 1 105.1	54.4	0.43	020853	
15.5	.9982843	2563	.1037865	—0131	.0450360	1317	173 31 63.1	12.4	0.46	020256	
16.0	—9990744	0485	+0959623	1893	+0416406	7366	174 0 81.5	30.7	0.49	019656	
16.5	.9997912	7674	.0881312	3585	.0382421	3385	174 29 100.5	49.7	0.50	019053	
17.0	1.0004347	4130	.0802940	5216	.0348411	7378	174 59 59.9	8.9	0.51	018447	
17.5	1.0010047	9851	.0724510	6788	.0314376	5346	175 28 79.7	28.8	0.51	017838	
18.0	1.0015012	4838	.0646081	8312	.0280319	1292	175 57 99.9	48.9	0.50	017226	
18.5	—1.0019242	9089	+0567505	9788	+0246243	7219	176 27 60.6	9.6	0.48	016611	
19.0	1.0022736	2605	.0488940	1226	.0212151	3130	176 56 81.7	30.6	0.46	015994	
19.5	1.0025492	5382	.0410341	2629	.0178044	9026	177 25 103.3	52.2	0.43	015374	
20.0	1.0027512	7424	.0331715	4005	.0143925	4910	177 55 65.3	14.1	0.40	014753	
20.5	1.0028796	8729	.0253068	5360	.0109798	—0786	178 24 87.8	36.6	0.36	014130	
21.0	—1.0029344	9299	+0174406	6700	+0075665	6856	178 53 110.6	59.3	0.32	013505	
21.5	1.0029156	9132	.0095734	8029	.0041528	2522	179 23 73.9	22.6	0.27	012879	
22.0	1.0028232	8230	+0017057	9353	+0007391	8387	179 52 97.6	46.2	0.21	012251	
22.5	1.0026572	6591	—0061616	9319	—0026747	5748	180 22 61.8	10.4	0.15	011621	
23.0	1.0024177	4218	.0140281	7983	.0060880	—9879	180 51 86.4	34.9	0.09	010991	
23.5	—1.0021047	1109	—0218933	6635	—0095009	4006	181 21 111.4	59.9	—0.03	010361	
24.0	1.0017183	7267	.0297565	5267	.0129128	8123	181 50 76.9	25.3	+0.04	009731	
24.5	1.0012584	2689	.0376172	3874	.0163236	2229	182 19 102.8	51.2	0.10	009100	
25.0	1.0007251	7378	.0454747	2449	.0197330	6321	182 49 69.1	17.4	0.17	008470	
25.5	1.0001186	1334	.0533285	0987	.0231409	0398	183 18 95.9	44.2	0.23	007839	
26.0	—9994387	4557	—0611780	9482	—0285469	4456	183 48 83.0	11.2	0.29	007209	
26.5	.9986656	7048	.0690228	7930	.0299509	8494	184 17 90.7	38.9	0.35	006579	
27.0	.9978593	8807	.0768624	6326	.0333526	2509	184 47 58.8	6.9	0.40	005949	
27.5	.9969598	9833	.0846960	4662	.0367518	6499	185 16 87.4	35.5	0.45	005320	
28.0	.9959872	—0129	.0925234	2937	.0401484	0464	185 46 56.5	4.5	0.49	004691	
28.5	—9949415	9693	—1003440	1144	—0435419	4897	186 15 86.0	34.0	0.52	004062	
29.0	.9938228	8528	.1081571	—9276	.0469322	8299	186 45 56.1	4.0	0.55	003436	
29.5	.9926311	6632	.1159622	7328	.0503191	2166	187 14 86.6	34.5	0.57	002810	
30.0	.9913666	4009	.1237588	5296	.0537023	5997	187 44 57.7	5.5	0.59	002186	
30.5	.9900292	0656	.1315463	8173	.0570817	—9790	188 13 89.3	37.1	0.60	001563	
Oct. 1.0	—9886191	6577	—1393242	0954	—0604570	8542	188 43 61.4	9.1	+0.60	000942	



# SUN'S COÖRDINATES, 1860. 389

Date. 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Oct. 1.5	—9871362	1770	—1470921	:8635	—0638279	7250	189 13 94.1	41.8	+0.59	0.0
2.0	9855806	6236	1548492	6208	0671942	0912	189 42 67.3	14.9	0.57	999703
2.5	9839525	9976	1625949	3665	0705556	4525	190 11 101.0	48.6	0.55	999085
3.0	9822519	2992	1703287	1008	0739119	8087	190 41 75.3	22.8	0.52	998468
3.5	9804788	5282	1780502	:8226	0772629	1596	191 10 110.1	57.6	0.48	997852
4.0	—9786334	6850	—1857589	5315	—0806083	5050	191 46 85.5	32.9	0.44	997236
4.5	9767156	7693	1934544	2273	0839480	8446	192 10 61.5	8.9	0.39	996622
5.0	9747254	7813	2011358	:9090	0872817	1783	192 39 98.1	45.4	0.33	996009
5.5	9726630	7210	2088028	5764	0906092	5057	193 9 75.3	22.6	0.27	995397
6.0	9705284	5886	2164547	2286	0939301	9266	193 39 53.0	0.2	0.20	994785
6.5	—9683217	3841	—2240910	:8653	—0972442	1406	194 8 91.4	38.6	0.14	994173
7.0	9660429	1075	2317109	4855	1005511	4475	194 38 70.3	17.4	+0.07	993561
7.5	9636922	7589	2393140	0890	1038507	7471	195 7 109.9	57.0	0.00	992949
8.0	9612698	3395	2468994	6748	1071429	0393	195 37 90.0	37.0	—0.06	992338
8.5	9587754	8465	2544667	2423	1104272	3236	196 7 70.7	17.7	0.13	991727
9.0	—9562098	2829	—2620154	:7917	—1187033	5997	196 36 111.9	56.8	0.19	991116
9.5	9535724	6479	2695449	3216	1169711	8675	197 6 93.7	40.6	0.25	990505
10.0	9508638	9415	2770546	:8318	1202302	1266	197 36 76.1	22.9	0.31	989893
10.5	9480840	1639	2845439	3215	1234805	3769	198 6 59.0	5.8	0.36	989280
11.0	9452338	3154	2920123	:7904	1267216	6181	198 35 102.5	49.2	0.42	988668
11.5	—9423117	8960	—2994592	2378	—1299533	8498	199 5 86.6	33.2	0.47	988055
12.0	9393194	4059	3068839	6630	1331754	0720	199 35 71.2	17.7	0.51	987442
12.5	9362565	3452	3142855	0652	1363875	2841	200 5 56.4	2.8	0.55	986829
13.0	9331234	2143	3216637	4439	1395894	4861	200 34 102.1	48.5	0.58	986214
13.5	9299201	:0132	3290179	:7987	1427809	6777	201 4 88.3	84.6	0.59	985599
14.0	—9266470	7423	—3363472	1286	—1459615	8584	201 34 76.1	21.4	0.60	984984
14.5	9233042	4017	3436513	4333	1491311	0281	202 4 62.4	8.6	0.60	984367
15.0	9198919	9916	3509295	7121	1522896	1867	202 33 110.2	56.4	0.60	983750
15.5	9164105	5123	3581814	:9646	1554366	3338	203 3 98.5	44.6	0.59	983133
16.0	9128608	9643	3654062	1900	1585717	4690	203 33 87.2	33.3	0.57	982516
16.5	—9092414	3475	—3726035	3890	—1616948	5923	204 3 76.5	32.5	0.54	981898
17.0	9055542	6625	3797728	5578	1648056	7032	204 33 66.1	12.0	0.51	981280
17.5	9017989	9094	3869130	6988	1679039	8017	205 3 56.3	2.1	0.47	980661
18.0	8979757	:0884	3940239	:8106	1709894	8873	205 32 106.9	52.7	0.42	980043
18.5	8940850	1999	4011049	:8924	1740620	:9601	206 2 98.0	43.7	0.37	979425
19.0	—8901270	2441	—4081554	:9437	—1771213	0196	206 32 89.5	35.2	0.32	978807
19.5	8861021	2213	4161749	:9640	1801672	0657	207 2 81.5	27.1	0.26	978189
20.0	8820106	1320	4221629	:9528	1831994	0981	207 32 73.8	19.4	0.20	977574
20.5	8778529	9764	4291188	:9095	1862177	1166	208 2 66.6	12.2	0.14	976958
21.0	8736292	7550	4360420	:8335	1892217	1208	208 32 59.8	5.3	—0.07	976345
21.5	—8693400	4678	—4429321	7245	—1922113	1106	209 1 113.5	58.9	0.00	975732
22.0	8649856	:1156	4497886	5818	1951863	0859	209 31 107.5	52.8	+0.06	975122
22.5	8605664	6985	4568109	4050	1981464	0463	210 1 102.0	47.3	0.12	974513
23.0	8560827	2170	4633985	1935	2010915	:9917	210 31 96.9	42.1	0.18	973906
23.5	8515349	6713	4701509	:9468	2040213	:9218	211 1 92.2	37.4	0.24	973301
24.0	—8469234	:0620	—4768677	6645	—2069356	8364	211 31 87.9	33.0	0.29	972699
24.5	8422484	3891	4835484	3462	2098343	7354	212 1 84.1	29.2	0.34	972098
25.0	8375104	6533	4901925	:9912	2127172	6186	212 31 80.7	25.7	0.39	971502
25.5	8327095	8545	4967996	5993	2155841	4858	213 1 77.8	22.8	0.43	970907
26.0	8278463	9935	5033691	1698	2184348	3368	213 31 75.2	20.1	0.46	970317
26.5	—8229209	:0702	—5099006	7024	—2212690	1714	214 1 73.2	18.0	0.48	969728
27.0	8179337	:0852	5163935	1964	2240864	:9891	214 31 71.5	16.2	0.50	969146
27.5	8128851	:0388	5228476	6516	2268870	7901	215 1 70.3	15.0	0.51	968565
28.0	8077753	9310	5292621	0672	2296704	5738	215 31 69.5	14.1	0.51	967990
28.5	8026047	7624	5356367	4429	2324365	3403	216 1 69.2	15.8	0.51	967417
29.0	—7973738	5336	—5419709	7782	—2351853	0894	216 31 69.3	13.8	0.50	966849
29.5	7920828	2446	5482644	0728	2379164	8209	217 1 69.9	14.3	0.48	966283
30.0	7867320	8958	5545165	3260	2406296	5344	217 31 71.0	15.4	0.46	965722
30.5	7813220	4879	5607268	5374	2433248	2300	218 1 72.6	16.9	0.42	965164
31.0	7758530	:0210	5668950	7067	2460017	:9073	218 31 74.7	18.9	0.38	964611
31.5	—7703254	4953	—5730205	:8334	—2486602	5663	219 1 77.3	21.4	+0.34	964061

☞ The first figures of this and the following logarithms are 9.9.



# 390 SUN'S COÖRDINATES, 1860.

Date. 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Nov. 1.0	—7647395	9114	—5791028	9169	—2512998	3063	219 31' 30.4"	24.4	+0.99	963516
1.5	7590957	3695	5851416	9569	3539207	8277	220 1 34.0	28.0	0.25	962973
2.0	7533944	5702	5911864	9529	3565223	4297	220 31 38.1	32.0	0.16	962435
2.5	7476359	8136	5970868	9046	3591046	0125	221 1 32.7	36.6	0.10	961900
3.0	7418206	0003	6029922	8112	3616676	5759	221 31 37.8	41.6	+0.03	961369
3.5	—7359489	1305	—6088531	6724	—2642109	1197	222 1 103.4	47.2	—0.03	960841
4.0	7300212	2047	6146661	4876	2667341	6433	222 31 109.5	53.2	0.10	960318
4.5	7240378	2232	6204337	2565	2692373	1470	223 1 116.1	59.7	0.17	959797
5.0	7179991	1864	6261543	9784	2717201	6303	223 32 63.3	6.8	0.24	959281
5.5	7119054	0946	6318276	6531	2741824	0931	224 2 70.9	14.3	0.31	958767
6.0	—7057572	9483	—6374530	2798	—2766238	5359	224 32 72.1	22.5	0.37	958256
6.5	6995549	7479	6430301	8583	2790442	9560	225 2 87.8	31.1	0.43	957747
7.0	6932989	4937	6485585	3881	2814434	3557	225 32 97.1	40.3	0.49	957241
7.5	6869895	1869	6540376	8686	2838212	7340	226 2 106.8	50.0	0.54	956738
8.0	6806274	8259	6594668	2992	2861774	0908	226 33 57.0	0.1	0.59	956237
8.5	—6742130	4133	—6648462	6800	—2885118	4257	227 3 67.7	10.8	0.68	955738
9.0	6677469	9491	6701747	0099	2908242	7387	227 33 78.9	21.9	0.66	955242
9.5	6612293	4334	6754521	2887	2931144	0295	228 3 90.6	33.5	0.67	954747
10.0	6546608	8667	6806779	5160	2953822	2979	228 33 102.7	45.5	0.68	954255
10.5	6480420	2498	6868517	6912	2976274	5437	229 3 115.3	58.0	0.68	953765
11.0	—6413733	5829	—6909730	8140	—2998497	7666	229 34 68.3	10.9	0.68	953277
11.5	6346553	8667	6960413	8838	3020490	9666	230 4 81.8	24.3	0.67	952791
12.0	6278884	1016	7010561	9001	3042251	1433	230 34 95.7	36.2	0.66	952307
12.5	6210732	2882	7060172	8628	3063778	2966	231 4 110.0	52.4	0.62	951825
13.0	6142103	4271	7109240	7712	3085069	4264	231 35 64.7	7.1	0.61	951346
13.5	—6073002	5188	—7157762	6250	—3106122	5323	232 5 79.8	22.1	0.57	950869
14.0	6003433	5637	7205733	4286	3128935	6143	232 35 95.3	37.5	0.53	950394
14.5	5933403	5615	7253147	1667	3147507	6792	233 5 111.2	53.3	0.48	949921
15.0	5862918	5157	7300002	8539	3167837	7058	233 36 67.4	9.4	0.43	949450
15.5	5791983	4240	7346294	4848	3187922	7150	234 6 84.0	26.9	0.38	948982
16.0	—5720604	2878	—7392020	0591	—3207761	6996	234 36 100.9	42.7	0.32	948516
16.5	5648787	1078	7437176	5764	3227353	6595	235 6 118.2	59.9	0.26	948052
17.0	5576537	8845	7481758	0363	3246695	5944	235 37 75.8	17.5	0.20	947592
17.5	5503859	6184	7525762	4384	3265786	5042	236 7 93.7	35.3	0.14	947134
18.0	5430762	3103	7569185	7824	3284625	3888	236 37 111.9	53.5	—0.07	946681
18.5	—5357249	9607	—7612023	0680	—3303210	2480	237 8 70.4	11.9	0.00	946230
19.0	5283328	5702	7654273	2947	3321541	0819	237 38 89.2	30.6	+0.06	945783
19.5	5209005	1395	7695933	4625	3339616	8902	238 8 108.3	49.6	0.12	945339
20.0	5134285	6691	7736999	5708	3357433	6726	238 39 67.7	8.9	0.17	944899
20.5	5059174	1596	7777470	6197	3374992	4293	239 9 87.4	18.5	0.22	944463
21.0	—4983677	6114	—7817340	6085	—3392291	1599	239 39 107.3	48.3	0.27	944031
21.5	4907800	0253	7856608	5371	3409328	8644	240 10 67.6	8.6	0.31	943604
22.0	4831550	4018	7895271	4052	3426103	5426	240 40 88.0	28.9	0.35	943181
22.5	4754932	7415	7933327	2126	3442614	1945	241 10 108.7	49.2	0.38	942762
23.0	4677951	0459	7970771	9588	3458861	8200	241 41 69.8	10.6	0.40	942350
23.5	—4600614	8127	—8007602	6438	—3474843	4190	242 11 91.3	31.9	0.41	941942
24.0	4522927	5455	8043817	2672	3490558	9913	242 41 112.8	53.3	0.42	941540
24.5	4444895	7438	8079414	8289	3506005	5368	243 12 74.7	15.2	0.42	941141
25.0	4366525	9083	8114389	3283	3521182	0553	243 42 96.8	37.2	0.41	940753
25.5	4287823	0396	8148741	7655	3536089	5468	244 12 119.2	59.7	0.40	940368
26.0	—4208793	1380	—8182466	1399	—3550725	0112	244 43 82.0	22.2	0.38	939990
26.5	4129441	2042	8215563	4516	3565088	4484	245 13 105.1	45.2	0.34	939617
27.0	4049774	2389	8248028	7000	3579178	8582	245 44 68.3	8.4	0.30	939250
27.5	3969797	2426	8279860	8852	3592993	2406	246 14 91.9	31.9	0.25	938889
28.0	3889514	2157	8311056	0067	3606533	5954	246 44 115.7	55.6	0.20	938534
28.5	—3808933	1590	—8341615	0646	—3619796	9226	247 15 79.9	17.7	0.14	938185
29.0	3728058	0728	8371584	0585	3632782	2221	247 45 104.4	44.1	0.08	937842
29.5	3646894	9577	8400810	9881	3645489	4937	248 16 69.2	8.8	+0.01	937505
30.0	3565449	8145	8429440	8531	3657916	7373	248 46 94.4	33.9	—0.05	937174
30.5	3483727	6436	8457424	6536	3670062	9528	249 16 118.8	59.2	0.11	936849
Dec. 1.0	—3401735	4456	—8484758	3891	—3681926	1401	249 47 85.7	25.0	—0.18	936531



# SUN'S COÖRDINATES, 1860. 391

Date. 1860.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .	
Dec. 1.5	—3319477	3211	—8511440	0594	—3693507	2992	250 17 111.8	51.1	—0.24	936218	
2.0	3236962	9708	8537466	6641	3704803	4297	250 48 78.3	17.5	0.31	935912	
2.5	3154194	6953	8562836	2032	3715814	5318	251 18 105.1	44.2	0.37	935610	
3.0	3071178	3949	8587543	6762	3726539	6052	251 49 72.2	11.2	0.44	935315	
3.5	2987922	0705	8611598	0831	3736977	6500	252 19 99.6	38.5	0.50	935025	
4.0	—2904432	7227	—8634976	4236	—3747126	6658	252 50 67.3	6.1	0.55	934740	
4.5	2820714	3521	8657694	6976	3756986	6528	253 20 95.3	34.0	0.60	934461	
5.0	2736774	9592	8679741	9045	3766555	6106	253 51 63.7	2.3	0.65	934188	
5.5	2652619	5448	8701119	0445	3775833	5394	254 21 92.4	0.9	0.69	933920	
6.0	2568254	1093	8721822	1169	3784820	4391	254 51 121.4	59.8	0.72	933656	
6.5	—2483686	6535	—8741851	1220	—3793514	3095	255 22 90.7	29.0	0.74	933397	
7.0	2398921	1780	8761202	0593	3801912	1502	255 52 120.3	58.6	0.76	933143	
7.5	2313966	6835	8779875	9289	3810014	9614	256 23 90.2	28.4	0.77	932892	
8.0	2228928	1707	8797866	7302	3817890	7429	256 53 120.4	58.5	0.77	932646	
8.5	2143513	6402	8815175	4634	3825330	4949	257 24 90.8	28.8	0.77	932404	
9.0	—2058028	0926	—8831798	1279	—3832542	2171	257 54 121.5	59.4	0.76	932166	
9.5	1972380	5287	8847734	7238	3839456	9095	258 25 92.5	30.3	0.74	931932	
10.0	1886577	9498	8862980	2507	3846071	5720	258 56 63.7	1.4	0.71	931703	
10.5	1800624	3549	8877535	7086	3852386	2045	259 26 95.2	32.8	0.67	931477	
11.0	1714529	7463	8891898	0972	3858399	8068	259 57 66.9	4.4	0.63	931255	
11.5	—1628299	1242	—8904568	4166	—3864113	3792	260 27 98.8	36.3	0.58	931037	
12.0	1541941	4892	8917044	6665	3869523	9212	260 58 70.9	8.3	0.53	930823	
12.5	1455462	8421	8928825	8470	3874633	4332	261 28 103.2	40.5	0.47	930612	
13.0	1368871	1838	8939909	9577	3879439	9149	261 59 75.6	12.8	0.41	930405	
13.5	1282178	5148	8950296	9988	3883943	3663	262 29 108.2	45.3	0.35	930202	
14.0	—1195377	8559	—8959984	9700	—3888143	7874	263 0 80.9	17.9	0.29	930003	
14.5	1108489	1478	8968973	8713	3892040	1781	263 30 113.8	50.7	0.23	929808	
15.0	1021516	4512	8977262	7026	3895633	5385	264 1 86.8	23.6	0.16	929617	
15.5	0934465	7468	8984850	4638	3898922	8684	264 31 119.9	56.6	0.09	929430	
16.0	0847345	0354	8991737	1548	3901907	1680	265 2 93.1	29.7	—0.03	929247	
16.5	—0760163	8178	—8997923	7758	—3904588	4871	265 33 66.5	3.1	+0.03	929069	
17.0	0672925	5946	9003407	3266	3906964	6758	266 3 99.8	36.3	0.09	928895	
17.5	0585637	5664	9008189	8073	3909036	8841	266 34 73.3	9.7	0.15	928726	
18.0	0498307	1339	9012369	2177	3910803	0619	267 4 106.7	43.0	0.20	928562	
18.5	0410942	3980	9015646	5579	3912266	2093	267 35 80.3	16.5	0.25	928402	
19.0	—0323549	6592	—9018320	8277	—3913424	3262	268 5 113.9	50.0	0.29	928248	
19.5	0236135	9184	9020293	0275	3914278	4127	268 36 87.6	23.6	0.32	928098	
20.0	0148706	1760	9021563	1569	3914828	4688	269 6 121.3	57.2	0.34	927955	
20.5	—0061268	4329	—9022132	2163	—3915075	4946	269 37 95.1	30.9	0.35	927817	
21.0	+0026171	8107	9022001	2057	3915017	4899	270 8 68.9	4.6	0.36	927685	
21.5	+0113605	0537	9021169	1250	3914656	4549	270 38 102.8	38.4	0.36	927559	
22.0	0201026	7954	9019638	9744	3913992	3896	271 9 76.6	12.1	0.35	927440	
22.5	0288428	5352	9017407	7538	3913024	2939	271 39 110.4	45.9	0.33	927327	
23.0	0375802	2722	9014476	4632	3911753	1679	272 10 84.3	19.6	0.31	927220	
23.5	0463143	0059	9010846	1027	3910179	0116	272 40 118.2	53.4	0.28	927120	
24.0	+0550444	7356	9006518	6724	3908303	8251	273 11 92.1	27.2	0.24	927026	
24.5	0637699	4607	9001493	1724	3906124	6083	273 42 66.0	1.0	0.20	926938	
25.0	0724901	1806	8995772	6029	3903643	3613	274 12 99.9	34.8	0.16	926859	
25.5	0812046	8949	8989353	9635	3900860	0842	274 43 73.8	8.7	0.10	926786	
26.0	0899127	6028	8982228	2546	3897775	7768	275 13 107.8	42.5	+0.04	926721	
26.5	+0986138	3037	8974427	4760	3894388	4393	275 44 81.9	16.5	—0.02	926662	
27.0	1073073	9971	8965922	6281	3890700	0716	276 14 115.9	50.5	0.08	926611	
27.5	1159925	6821	8956722	7107	3886711	6739	276 45 90.1	24.6	0.15	926566	
28.0	1246687	3582	8946829	7240	3882421	2461	277 15 124.2	58.6	0.21	926529	
28.5	1333354	0247	8936242	6679	3877830	7882	277 46 98.5	31.8	0.28	926498	
29.0	+1419920	6812	8924963	5426	3872939	3003	278 17 72.7	6.9	0.34	926475	
29.5	1506378	3269	8912992	3481	3867747	7823	278 47 107.0	38.2	0.41	926459	
30.0	1592721	9611	8900331	0846	3862256	2344	279 18 81.4	15.4	0.47	926451	
30.5	1678943	5832	8886979	7520	3856465	6565	279 48 115.8	49.7	0.53	926450	
31.0	1765038	1927	8872938	3505	3850375	0486	280 19 90.2	24.0	0.59	926454	
31.5	1851000	7890	8858208	8801	3843986	4109	280 49 124.7	58.5	0.64	926466	
32.0	+1936821	3713	8842791	3410	3837299	7433	281 20 99.3	32.9	—0.68	926483	



# 392 HELIOCENTRIC COORDINATES.

MERCURY.						VENUS.					
Days fr. begin'g of Julian Period.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.	
240											
0410	-0.3770	+0.0257	+0.0519	9.5814	173 6.0	+0.6588	-0.2642	-0.1608	9.8620	335 5.1	
0415	0.3983	-0.0923	-0.0094	9.6117	192 18.9	0.6944	0.1777	0.1240	9.8618	342 59.8	
0420	0.3766	0.2007	0.0699	9.6360	209 14.8	0.7164	-0.0878	0.0848	9.8616	350 55.2	
0425	0.3205	0.2911	0.1242	9.6536	224 37.0	0.7251	+0.0036	0.0440	9.8619	358 51.2	
0430	0.2384	0.3580	0.1685	9.6646	239 0.4	0.7198	0.0950	-0.0024	9.8609	6 48.0	
0435	0.1384	0.3981	0.2002	9.6689	252 52.6	0.7007	0.1846	+0.0393	9.8606	14 45.5	
0440	-0.0283	0.4093	0.2173	9.6668	266 42.6	0.6874	0.2706	0.0803	9.8602	22 44.0	
0445	+0.0839	0.3904	0.2185	9.6581	280 42.4	0.6215	0.3513	0.1195	9.8597	30 43.2	
0450	0.1893	0.3409	0.2025	9.6428	295 50.6	0.5635	0.4255	0.1567	9.8594	38 43.3	
0455	0.2781	0.2618	0.1690	9.6208	312 9.6	0.4946	0.4911	0.1907	9.8590	46 44.3	
0460	0.3385	0.1565	0.1184	9.5925	330 29.7	0.4160	0.5470	0.2210	9.8585	54 46.3	
0465	0.3570	-0.0325	-0.0536	9.5593	351 38.7	0.3292	0.5923	0.2469	9.8582	62 49.1	
0470	0.3206	+0.0958	+0.0191	9.5252	16 23.6	0.2359	0.6260	0.2680	9.8578	70 52.8	
0475	0.2226	0.2047	0.0876	9.4981	44 59.0	0.1379	0.6473	0.2837	9.8574	78 57.4	
0480	+0.0740	0.2659	0.1356	9.4879	76 13.9	+0.0373	0.6558	0.2940	9.8572	87 2.6	
0485	-0.0929	0.2617	0.1502	9.4993	107 23.2	-0.0641	0.6513	0.2982	9.8569	95 8.5	
0490	0.2393	0.1975	0.1304	9.5271	135 45.7	0.1642	0.6338	0.2967	9.8567	103 14.9	
0495	0.3410	+0.0950	0.0856	9.5613	160 16.7	0.2610	0.6038	0.2893	9.8565	111 21.6	
0500	0.3913	-0.0227	+0.0274	9.5943	181 14.2	0.3527	0.5618	0.2760	9.8564	119 28.6	
0505	0.3942	0.1381	-0.0344	9.6223	199 25.7	0.4373	0.5086	0.2573	9.8564	127 35.9	
0510	0.3575	0.2400	0.0896	9.6439	215 88.9	0.5132	0.4450	0.2335	9.8564	135 43.1	
0515	0.2898	0.3213	0.1435	9.6588	230 33.4	0.5789	0.3731	0.2049	9.8564	143 50.3	
0520	0.1995	0.3777	0.1830	9.6671	244 41.1	0.6316	0.2932	0.1724	9.8566	151 57.2	
0525	-0.0943	0.4063	0.2090	9.6689	258 29.6	0.6747	0.2079	0.1364	9.8568	160 3.8	
0530	+0.0175	0.4053	0.2198	9.6641	272 24.0	0.7029	0.1181	0.0978	9.8570	168 9.8	
0535	0.1280	0.3739	0.2141	9.6527	286 49.9	0.7171	+0.0260	0.0570	9.8573	176 15.3	
0540	0.2280	0.3122	0.1910	9.6347	302 16.7	0.7172	-0.0662	+0.0152	9.8576	184 20.2	
0545	0.3068	0.2219	0.1504	9.6100	319 19.5	0.7031	0.1575	-0.0268	9.8579	192 24.1	
0550	0.3518	-0.1078	0.0935	9.5794	338 42.1	0.6752	0.2456	0.0684	9.8583	200 27.4	
0555	0.3495	+0.0902	-0.0244	9.5452	1 4.0	0.6339	0.3290	0.1086	9.8587	208 29.9	
0560	0.2881	0.1440	+0.0483	9.5128	27 34.4	0.5802	0.4055	0.1466	9.8591	216 31.3	
0565	0.1669	0.2367	0.1105	9.4914	57 29.4	0.5153	0.4743	0.1819	9.8596	224 31.9	
0570	+0.0061	0.2724	0.1459	9.4900	89 4.8	0.4403	0.5339	0.2134	9.8599	232 31.5	
0575	-0.1567	0.2419	0.1459	9.5092	119 21.2	0.3567	0.5832	0.2411	9.8604	240 30.3	
0580	0.2868	0.1591	0.1146	9.5408	146 11.5	0.2661	0.6215	0.2641	9.8603	248 28.0	
0585	0.3676	+0.0479	0.0629	9.5752	169 10.9	0.1705	0.6473	0.2817	9.8611	256 25.4	
0590	0.3978	-0.0706	+0.0224	9.6064	188 54.9	-0.0716	0.6608	0.2940	9.8614	264 21.7	
0595	0.3836	0.1816	-0.0589	9.6319	206 13.0	+0.0288	0.6616	0.3006	9.8617	272 17.5	
0600	0.3332	0.2758	0.1147	9.6508	221 49.9	0.1288	0.6495	0.3016	9.8619	280 12.9	
0605	0.2554	0.3474	0.1610	9.6630	236 21.8	0.2259	0.6251	0.2967	9.8621	288 7.6	
0610	0.1581	0.3928	0.1953	9.6686	250 18.8	0.3190	0.5888	0.2861	9.8622	296 2.0	
0615	-0.0493	0.4095	0.2153	9.6677	264 6.6	0.4057	0.5411	0.2700	9.8623	303 56.2	
0620	+0.0631	0.3962	0.2195	9.6602	278 10.6	0.4847	0.4833	0.2488	9.8623	311 50.4	
0625	0.1705	0.3524	0.2068	9.6462	292 57.4	0.5546	0.4159	0.2229	9.8623	319 44.7	
0630	0.2633	0.2788	0.1766	9.6254	308 58.6	0.6137	0.3410	0.1926	9.8622	327 39.0	
0635	0.3299	0.1780	0.1291	9.5982	326 52.5	0.6613	0.2590	0.1586	9.8620	335 33.6	
0640	0.3574	-0.0566	-0.0666	9.5657	347 26.0	0.6961	0.1722	0.1217	9.8618	343 28.6	
0645	0.3321	+0.0724	+0.0054	9.5313	11 27.4	0.7176	-0.0823	0.0824	9.8615	351 24.1	
0650	0.2455	0.1871	0.0758	9.5022	39 21.8	0.7251	+0.0092	-0.0415	9.8613	359 20.3	
0655	+0.1045	0.2592	0.1288	9.4881	70 17.2	0.7190	0.1006	+0.0003	9.8609	7 17.0	
0660	-0.0621	0.2676	0.1502	9.4956	101 41.8	0.6989	0.1900	0.0418	9.8606	15 14.7	
0665	0.2148	0.2132	0.1364	9.5211	130 43.7	0.6650	0.2759	0.0828	9.8602	23 13.0	
0670	0.3259	+0.1160	0.0953	9.5548	155 58.5	0.6184	0.3560	0.1219	9.8598	31 12.3	
0675	0.3857	-0.0004	+0.0388	9.5884	177 32.7	0.5597	0.4297	0.1590	9.8594	39 13.3	
0680	0.3969	0.1172	-0.0229	9.6175	196 11.5	0.4902	0.4948	0.1927	9.8590	47 13.4	
0685	0.3670	0.2223	0.0825	9.6404	212 43.6	0.4109	0.5501	0.2226	9.8585	55 14.4	
0690	0.3044	0.3079	0.1348	9.6565	227 50.2	0.3236	0.5946	0.2484	9.8581	63 18.2	
0695	0.2177	0.3692	0.1765	9.6661	242 4.7	0.2301	0.6276	0.2690	9.8578	71 22.0	
0700	0.1148	0.4031	0.2052	9.6690	255 54.9	0.1320	0.6481	0.2845	9.8575	79 26.5	
0705	-0.0036	0.4078	0.2190	9.6655	269 46.2	+0.0312	0.6559	0.2944	9.8571	87 31.7	
0710	+0.1079	-0.3821	-0.2165	9.6554	284 4.2	-0.0701	+0.6507	+0.2982	9.8568	95 37.6	



# HELIOCENTRIC COÖRDINATES. 393

## MERCURY.

Days fr. begin'g of Julian Period.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.
240					
0715	+0.2106	-0.2260	-0.1967	9.6386	999 17.1
0720	0.2342	0.2408	0.1593	9.6151	315 58.9
0725	0.2466	0.1306	0.1053	9.5855	334 51.5
0730	0.2541	-0.0041	-0.0380	9.5517	356 44.1
0735	0.2644	+0.1223	+0.0350	9.5183	22 20.6
0740	0.1986	0.2231	0.1004	9.4941	51 40.4
0745	+0.0376	0.2708	0.1418	9.4886	83 10.0
0750	-0.1278	0.2522	0.1486	9.5044	113 53.9
0755	0.2659	0.1775	0.1224	9.5344	141 27.6
0760	0.2564	+0.0698	0.0736	9.5688	165 8.7
0765	0.2958	-0.0486	+0.0139	9.6009	185 25.6
0770	0.3092	0.1619	-0.0477	9.6276	203 7.4
0775	0.3450	0.2597	0.1048	9.6478	219 0.3
0780	-0.2716	-0.3359	-0.1532	9.6612	233 42.1

## VENUS.

X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.
-0.1701	+0.6324	+0.2964	9.8567	103 44.0
0.2667	0.6017	0.2885	9.8565	111 50.8
0.3580	0.5589	0.2750	9.8565	119 57.8
0.4421	0.5050	0.2559	9.8564	128 5.0
0.5175	0.4410	0.2319	9.8564	136 12.3
0.5825	0.3683	0.2031	9.8564	144 19.5
0.6351	0.2882	0.1703	9.8566	152 26.4
0.6767	0.2023	0.1341	9.8567	160 33.0
0.7041	0.1126	0.0953	9.8569	168 39.1
0.7175	+0.0206	0.0545	9.8572	176 44.6
0.7168	-0.0719	+0.0127	9.8578	184 49.5
0.7017	0.1629	-0.0294	9.8579	192 53.5
0.6728	0.2508	0.0709	9.8583	200 56.7
-0.6309	-0.3342	-0.1110	9.8586	208 59.1

## MARS.

Days fr. begin'g of Julian Period.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.
240					
0410	-1.6051	-0.2831	-0.0874	0.2128	190 22.9
0420	1.5686	0.3961	0.1403	0.2105	194 57.0
0430	1.5213	0.5064	0.1923	0.2081	199 34.1
0440	1.4633	0.6132	0.2429	0.2055	204 14.5
0450	1.3949	0.7156	0.2918	0.2026	208 58.5
0460	1.3162	0.8128	0.3386	0.1996	213 46.3
0470	1.2278	0.9039	0.3828	0.1964	218 38.2
0480	1.1300	0.9881	0.4241	0.1931	223 34.6
0490	1.0235	1.0647	0.4621	0.1896	228 35.7
0500	0.9087	1.1327	0.4965	0.1860	233 41.8
0510	0.7865	1.1914	0.5267	0.1823	238 53.0
0520	0.6577	1.2402	0.5525	0.1786	244 9.6
0530	0.5233	1.2782	0.5736	0.1748	249 31.7
0540	0.3842	1.3050	0.5896	0.1710	254 59.5
0550	0.2417	1.3199	0.6003	0.1673	260 33.0
0560	-0.0969	1.3225	0.6053	0.1637	266 12.2
0570	+0.0488	1.3125	0.6046	0.1602	271 57.1
0580	0.1941	1.2897	0.5980	0.1568	277 47.5
0590	0.3373	1.2540	0.5854	0.1536	283 43.1
0600	0.4772	1.2054	0.5668	0.1507	289 43.7
0610	0.6120	1.1443	0.5423	0.1481	295 49.1
0620	0.7403	1.0709	0.5120	0.1458	301 58.6
0630	0.8607	0.9861	0.4762	0.1439	308 11.7
0640	0.9715	0.8904	0.4352	0.1423	314 27.7
0650	1.0717	0.7849	0.3893	0.1412	320 46.1
0660	1.1599	0.6706	0.3391	0.1405	327 6.1
0670	1.2352	0.5489	0.2852	0.1403	333 26.8
0680	1.2965	0.4210	0.2280	0.1406	339 47.5
0690	1.3434	0.2884	0.1683	0.1412	346 7.5
0700	1.3753	0.1525	0.1067	0.1423	352 25.8
0710	1.3920	-0.0150	-0.0440	0.1439	358 41.9
0720	1.3933	+0.1227	+0.0193	0.1458	4 55.0
0730	1.3798	0.2591	0.0824	0.1481	11 4.4
0740	1.3516	0.3928	0.1445	0.1507	17 9.7
0750	1.3092	0.5223	0.2052	0.1536	23 10.4
0760	1.2535	0.6464	0.2638	0.1568	29 6.1
0770	1.1852	0.7642	0.3197	0.1602	34 56.5
0780	+1.1052	+0.8745	+0.3724	0.1637	40 41.4

## JUPITER.

X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.
-1.73097	+4.51010	+1.98074	0.71776	109 21 39
1.80385	4.48922	1.97353	0.71807	110 11 5
1.87436	4.46739	1.96591	0.71837	111 0 27
1.94548	4.44464	1.95789	0.71866	111 49 45
2.01616	4.42097	1.94947	0.71896	112 38 59
2.08644	4.39639	1.94064	0.71926	113 28 8
2.15629	4.37092	1.93140	0.71955	114 17 14
2.22570	4.34454	1.92177	0.71984	115 6 16
2.29465	4.31726	1.91175	0.72014	115 55 14
2.36313	4.28910	1.90133	0.72043	116 44 8
2.43113	4.26007	1.89052	0.72072	117 32 58
2.49863	4.23017	1.87934	0.72101	118 21 44
2.56563	4.19941	1.86776	0.72129	119 10 26
2.63211	4.16780	1.85580	0.72158	119 59 4
2.69806	4.13533	1.84346	0.72186	120 47 38
2.76346	4.10202	1.83075	0.72214	121 36 9
2.82831	4.06788	1.81768	0.72242	122 24 36
2.89259	4.03292	1.80424	0.72270	123 12 59
2.95629	3.99716	1.79043	0.72298	124 1 19
3.01939	3.96059	1.77626	0.72326	124 49 35
3.08189	3.92322	1.76175	0.72353	125 37 47
3.14377	3.88507	1.74688	0.72380	126 25 56
3.20501	3.84614	1.73166	0.72407	127 14 1
3.26562	3.80644	1.71609	0.72434	128 2 3
3.32558	3.76600	1.70019	0.72461	128 50 1
3.38487	3.72480	1.68395	0.72487	129 37 56
3.44350	3.68287	1.66737	0.72514	130 25 47
3.50144	3.64022	1.65046	0.72540	131 13 34
3.55869	3.59684	1.63323	0.72566	132 1 18
3.61523	3.55276	1.61567	0.72592	132 48 59
3.67107	3.50797	1.59779	0.72617	133 36 36
3.72619	3.46251	1.57961	0.72642	134 24 10
3.78059	3.41635	1.56111	0.72667	135 11 40
3.83424	3.36952	1.54231	0.72691	135 59 7
3.88714	3.32203	1.52319	0.72716	136 46 31
3.93930	3.27388	1.50378	0.72740	137 33 52
3.99068	3.22511	1.48409	0.72764	138 21 10
-4.04128	+3.17571	+1.46410	0.72788	139 8 25



# 394 HELIOCENTRIC COÖRDINATES.

SATURN.						URANUS.					
Days fr. begin'g of Julian Period.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.	
240											
0420	-7.19410	+5.17540	+2.45716	0.96363	141 30 23	+7.81239	+16.25788	+7.02030	1.28682	66 11 39	
0440	7.26937	5.09286	2.42622	0.96386	142 13 40	7.73917	16.28321	7.03249	1.28673	66 25 34	
0460	7.34350	5.00956	2.39498	0.96409	142 56 54	7.66586	16.30822	7.04456	1.28665	66 39 29	
0480	7.41649	4.92552	2.36328	0.96433	143 40 4	7.59244	16.33296	7.05649	1.28656	66 53 24	
0500	7.48834	4.84074	2.33126	0.96456	144 23 11	7.51891	16.35746	7.06827	1.28647	67 7 20	
0520	7.55905	4.75520	2.29887	0.96480	145 6 15	7.44526	16.38168	7.07991	1.28639	67 21 16	
0540	7.62861	4.66892	2.26613	0.96504	145 49 16	7.37145	16.40561	7.09145	1.28630	67 35 12	
0560	7.69702	4.58192	2.23303	0.96528	146 32 15	7.29746	16.42931	7.10291	1.28622	67 49 8	
0580	7.76428	4.49421	2.19959	0.96553	147 15 11	7.22332	16.45273	7.11425	1.28613	68 3 5	
0600	7.83036	4.40582	2.16583	0.96577	147 58 5	7.14907	16.47588	7.12544	1.28605	68 17 2	
0620	7.89525	4.31678	2.13175	0.96602	148 40 56	7.07475	16.49874	7.13651	1.28597	68 30 59	
0640	7.95894	4.22711	2.09736	0.96627	149 23 43	7.00034	16.52133	7.14745	1.28588	68 44 57	
0660	8.02141	4.13681	2.06266	0.96652	150 6 26	6.92586	16.54262	7.15825	1.28580	68 58 55	
0680	8.08266	4.04589	2.02764	0.96677	150 49 6	6.85131	16.56565	7.16892	1.28571	69 12 53	
0700	8.14269	3.95437	1.99231	0.96702	151 31 44	6.77663	16.58737	7.17944	1.28563	69 26 51	
0720	8.20151	3.86224	1.95667	0.96728	152 14 19	6.70180	16.60885	7.18981	1.28554	69 40 50	
0740	8.25912	3.76951	1.92073	0.96753	152 56 52	6.62682	16.63012	7.20007	1.28545	69 54 49	
0760	8.31551	3.67620	1.88451	0.96779	153 39 22	6.55167	16.65106	7.21021	1.28536	70 8 48	
0780	-8.37066	+3.58235	+1.84802	0.96804	154 21 48	+6.47640	+16.67170	+7.22027	1.28527	70 22 48	
NEPTUNE.						INCLINATIONS AND NODES.					
Days fr. begin'g of Julian Period.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.	For Julian Date 2400600.					
240						Planets.	Inclina- tion.	Increase in 100 Days.	Longitude of Ascend- ing Node.	Incr. in 100 Days.	
0440	+29.8190	-1.3762	-1.3302	1.47588	356 34.5	Mercury	7° 1' 8.9	+0.01947	46° 40' 28"	11.469	
0480	29.8252	1.3588	1.2822	1.47537	356 49.1	Venus	8 31 22.0	+0.01232	75 26 27	9.004	
0520	29.8308	1.1414	1.2341	1.47535	357 3.7	Mars	1 51 2.1	-0.00611	48 28 27	7.600	
0560	29.8359	1.0240	1.1860	1.47534	357 18.3	Jupiter	1 18 39.2	-0.05632	99 2 33	9.990	
0600	29.8404	0.9065	1.1379	1.47532	357 32.9	Saturn	2 29 21.8	-0.03768	112 37 40	8.586	
0640	29.8444	0.7890	1.0898	1.47531	357 47.5	Uranus	0 46 29.8	+0.00834	73 17 23	4.898	
0680	29.8479	0.6716	1.0417	1.47529	358 2.2	Neptune	1 46 59.0		130 11 40		
0720	29.8509	0.5542	0.9936	1.47527	358 16.8						
0760	29.8534	0.4368	0.9454	1.47526	358 31.4						
0800	+29.8554	-0.3194	-0.8973	1.47524	358 46.0						
LOGARITHMS OF MASSES.											
Sun's = 1.											
Mercury,	93.3129	The Earth,	94.44985	Jupiter,	96.979689	Uranus,	95.60371				
Venus,	94.4089	Mars,	93.57176	Saturn,	96.45573	Neptune,	95.72630				



ECLIPSES IN 1860.

In the year 1860 there will be four Eclipses ; two of the Sun and two of the Moon.

I. An Annular Eclipse of the Sun, January 22, 1860, invisible at Washington, with the following elements : —

Washington Mean Time of $\zeta$ in Right Ascension, January 22				d.	h.	m.	s.
				22	6	43	4.3
Sun's and Moon's R.A.	20	18	6.68	Hourly Motions		10.53	and 121.76
Sun's Declination	—19	40	22.6	Hourly Motion		+ 0	34.5
Moon's Declination	—21	31	40.7	“ “		+ 9	24.4
Moon's Longitude	302	3	51.4	“ “		29	54.0
Moon's Latitude	— 0	49	58.5	“ “		+ 2	44.0
Sun's Equa. Hor. Par.			8.7	True Semidiameter		16	17.3
Moon's Equa. Hor. Par.	54	19.6		“ “		14	47.5

From these elements may be deduced the following results : —

Eclipse begins on the Earth, January 22<sup>d</sup>. 4<sup>h</sup>. 46<sup>m</sup>.5, Washington mean time, in longitude 183° 8'.1 West of Washington, and in latitude 49° 22'.8 South.

Central Eclipse begins 6<sup>h</sup>. 27<sup>m</sup>.5, in longitude 253° 19'.7 West of Washington, and in latitude 69° 13'.7 South.

Central Eclipse at noon 6<sup>h</sup>. 43<sup>m</sup>.1, in longitude 277° 48'.0, and in latitude 89° 1'.0 South.

Central Eclipse ends 8<sup>h</sup>. 11<sup>m</sup>.3, in longitude 10° 59'.0 West of Washington, and in latitude 41° 52'.2 South.

Eclipse ends on the Earth 9<sup>h</sup>. 51<sup>m</sup>.9, in longitude 49° 30'.2 West of Washington, and in latitude 15° 7'.0 South.

DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
h. m.				9.97	9.97	—9.53	—9.52	
4 40	—0.98617	—0.70750	—1.85293	3097	4573	3258	1724	67° 2' 0.2
4 45	0.94610	0.69397	1.83942	3099	4575	3242	1708	68 16 59.7
4 50	0.90603	0.68044	1.82591	3101	4577	3226	1692	69 31 59.3
4 55	0.86596	0.66691	1.81240	3103	4579	3210	1675	70 46 58.8
5 0	0.82590	0.65338	1.79888	3105	4581	3194	1659	72 1 58.3
5 5	0.78583	0.63985	1.78536	3107	4583	3178	1643	73 16 57.8
5 10	0.74576	0.62631	1.77184	3109	4585	3162	1627	74 31 57.3
5 15	0.70570	0.61377	1.75832	3111	4587	3146	1610	75 46 56.8
5 20	0.66563	0.60023	1.74480	3113	4589	3130	1594	77 1 56.3
5 25	—0.62556	—0.58669	—1.73127	3115	4591	3114	1578	78 16 55.8



DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

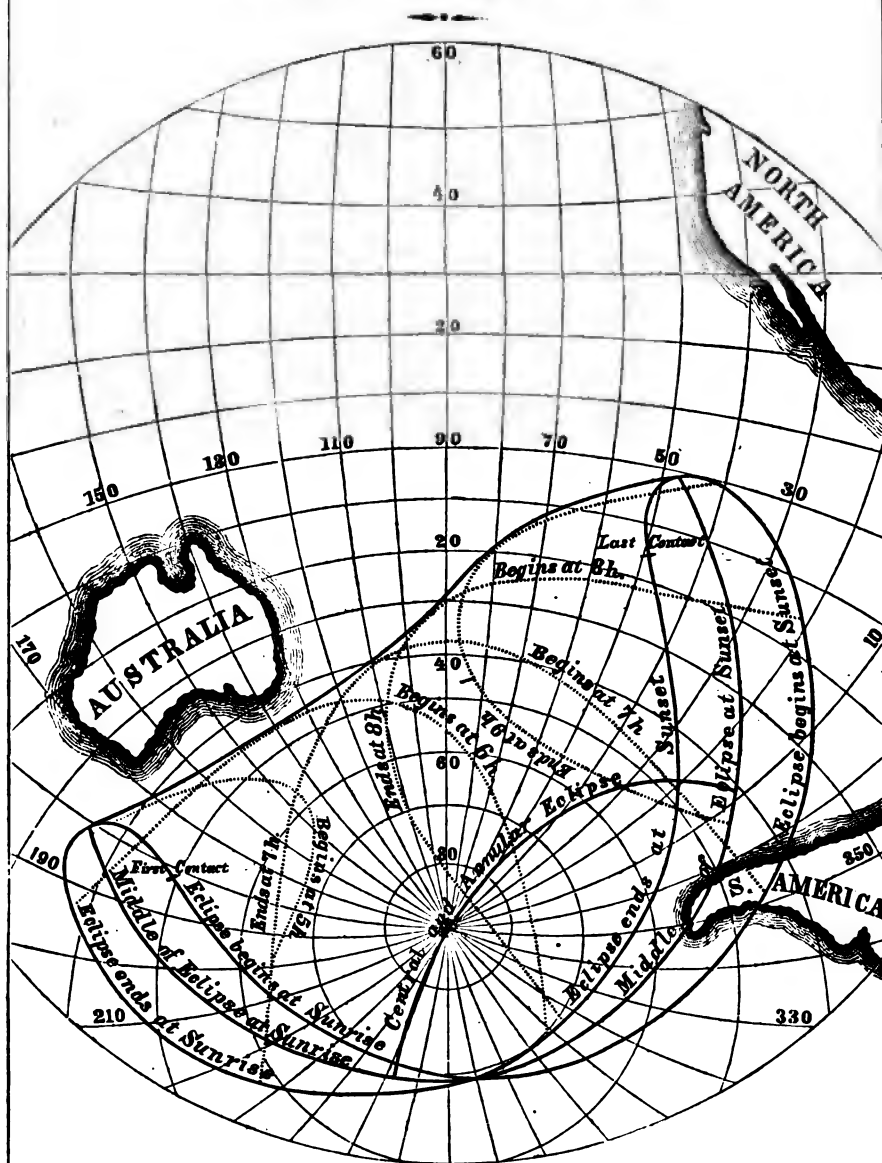
Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
h. m.				9.97	9.97	-9.53	-9.52	
5 30	-0.58550	-0.57214	-1.75774	3117	4593	3099	1561	79° 31' 55.4
5 35	0.54543	0.55859	1.74421	3119	4595	3083	1545	80 46 54.9
5 40	0.50536	0.54504	1.73068	3121	4597	3067	1529	82 1 54.4
5 45	0.46530	0.53149	1.71714	3123	4699	3051	1512	83 16 54.0
5 50	0.42523	0.51794	1.70360	3125	4601	3035	1496	84 31 53.5
5 55	0.38517	0.50439	1.69006	3127	4603	3019	1479	85 46 53.0
6 0	0.34511	0.49083	1.63651	3130	4606	3003	1462	87 1 52.6
6 5	0.30504	0.47727	1.62296	3132	4608	2987	1446	88 16 52.1
6 10	0.26498	0.46371	1.60941	3134	4610	2971	1430	89 31 51.6
6 15	0.22492	0.45015	1.59586	3136	4612	2955	1413	90 46 51.2
6 20	0.18486	0.43659	1.58231	3138	4614	2939	1396	92 1 50.7
6 25	0.14480	0.42302	1.56875	3140	4616	2923	1380	93 16 50.2
6 30	0.10474	0.40945	1.55519	3142	4618	2907	1364	94 31 49.7
6 35	0.06468	0.39588	1.54163	3144	4620	2891	1348	95 46 49.2
6 40	-0.02462	0.38230	1.52807	3146	4622	2875	1331	97 1 48.7
6 45	+0.01544	0.36872	1.51450	3148	4624	2859	1315	98 16 48.3
6 50	0.05550	0.35514	1.50093	3150	4666	2843	1298	99 31 47.8
6 55	0.09556	0.34156	1.48736	3152	4628	2827	1282	100 46 47.3
7 0	0.13561	0.32797	1.47379	3155	4630	2811	1265	102 1 46.9
7 5	0.17567	0.31439	1.46022	3157	4632	2795	1249	103 16 46.4
7 10	0.21572	0.30080	1.44664	3159	4634	2779	1232	104 31 46.0
7 15	0.25577	0.28721	1.43306	3161	4636	2763	1216	105 46 45.5
7 20	0.29583	0.27362	1.41948	3163	4638	2747	1199	107 1 45.0
7 25	0.33588	0.26003	1.40590	3165	4640	2731	1182	108 16 44.5
7 30	0.37593	0.24643	1.39231	3167	4642	2715	1166	109 31 44.1
7 35	0.41598	0.23283	1.37872	3169	4644	2699	1150	110 46 43.6
7 40	0.45603	0.21923	1.36513	3171	4646	2683	1133	112 1 43.1
7 45	0.49608	0.20563	1.35154	3173	4648	2667	1117	113 16 42.7
7 50	0.53613	0.19203	1.33795	3175	4650	2651	1100	114 31 42.2
7 55	0.57617	0.17842	1.32435	3177	4652	2635	1084	115 46 41.8
8 0	0.61621	0.16481	1.31075	3180	4655	2619	1067	117 1 41.3
8 5	0.65626	0.15120	1.29715	3182	4657	2603	1050	118 16 40.9
8 10	0.69630	0.13759	1.28355	3184	4659	2587	1034	119 31 40.4
8 15	0.73634	0.12398	1.26994	3186	4661	2571	1017	120 46 39.9
8 20	0.77638	0.11037	1.25633	3188	4663	2555	1001	122 1 39.4
8 25	0.81642	0.09675	1.24272	3191	4665	2539	985	123 16 39.0
8 30	0.85646	0.08313	1.22910	3193	4667	2523	968	124 31 38.5
9 35	0.89650	0.06951	1.21549	3195	4669	2507	952	125 46 38.0
8 40	0.93654	0.05589	1.20187	3197	4671	2491	935	127 1 37.5
8 45	0.97657	0.04226	1.18825	3199	4673	2475	918	128 16 37.1
8 50	1.01661	0.02864	1.17463	3201	4675	2459	902	129 31 36.6
8 55	1.05664	0.01501	1.16101	3203	4677	2443	886	130 46 36.1
9 0	1.09667	-0.00138	1.14738	3206	4679	2427	869	132 1 35.7
9 5	1.13670	+0.01225	1.13376	3208	4681	2411	853	133 16 35.2
9 10	1.17673	0.02588	1.12013	3210	4683	2395	836	134 31 34.8
9 15	1.21676	0.03952	1.10650	3212	4685	2379	820	135 46 34.3
9 20	1.25679	0.05314	1.09287	3214	4687	2363	803	137 1 33.8
9 25	1.29681	0.06678	1.07924	3216	4689	2347	787	138 16 33.4
9 30	1.33683	0.08040	1.06561	3218	4691	2331	770	139 31 32.9
9 35	1.37685	0.09407	1.05198	3220	4693	2315	754	140 46 32.4
9 40	1.41687	0.10771	1.03835	3222	4695	2299	737	142 1 32.0
9 45	1.45689	0.12136	1.02471	3224	4697	2283	720	143 16 31.5
9 50	1.49691	0.13501	1.01107	3226	4699	2267	703	144 31 31.0
9 55	1.53693	0.14866	0.99743	3228	4701	2251	687	145 46 30.6
10 0	+1.57695	+0.16231	-0.98379	3231	4704	2234	670	147 1 30.2



# ANNULAR ECLIPSE

**OF**

**JAN. 22, 1860.**





## FOR SHADOW.

Washington Mean Time.	B.	C.	Washington Mean Time.	B.	C.
<sup>h. m.</sup> 6 20	—0.96257	—1.03632	<sup>h. m.</sup> 7 20	—0.81961	—0.87349
6 25	0.96900	1.02276	7 25	0.80602	0.85991
6 30	0.95543	1.00920	7 30	0.79242	0.84632
6 35	0.94186	0.99564	7 35	0.77882	0.83273
6 40	0.92828	0.98208	7 40	0.76522	0.81914
6 45	0.91470	0.96851	7 45	0.75162	0.80555
6 50	0.90112	0.95494	7 50	0.73802	0.79195
6 55	0.88754	0.94137	7 55	0.72442	0.77835
7 0	0.87396	0.92780	8 0	0.71081	0.76475
7 5	0.86038	0.91423	8 5	0.69720	0.75115
7 10	0.84679	0.90065	8 10	0.68369	0.73755
7 15	—0.83320	—0.88707	8 15	—0.66998	—0.72394

A,  $\mu$ , log E, and log F are given in the Table for Penumbra, and the values of log G and log H are obtained from the corresponding values for Penumbra by numerically increasing log G by 0.000110, and log H by 0.000150.

II. A Partial Eclipse of the Moon, February 6, 1860, visible at Washington, with the following elements:—

Washington Mean Time of  $\delta$  in Right Ascension, February 6 <sup>d. h. m. s.</sup> 9 47 11.2.

Sun's Right Ascension	<sup>h. m. s.</sup> 21 20 14.67	Hourly Motion	<sup>s.</sup> 10.01
Moon's Right Ascension	9 20 14.67	" "	145.42
Sun's Declination	—15° 34' 1.9	Hourly Motion	+ 0' 46.3
Moon's Declination	—14 55 19.3	" "	—14 56.0

Washington Mean Time of  $\delta$  in Longitude, February 6 <sup>d. h. m. s.</sup> 9 27 10.8.

Moon's Longitude	<sup>° ' "</sup> 137 35 53.7	Hourly Motion	<sup>' "</sup> 38 0.6
Moon's Latitude	—0 35 42.1	" "	—3 28.1
Sun's Equa. Hor. Par.	8.7	True Semidiameter	16 15.2
Moon's Equa. Hor. Par.	61 22.3	" "	16 42.6

From these elements are deduced the following results:—

Moon enters Penumbra, February 6	<sup>d. h. m. s.</sup> 6 54.2	Washington Mean Time.
Moon enters Shadow	6 7 55.1	" "
Greatest Eclipse	6 9 21.3	" "
Moon leaves Shadow	6 10 47.5	" "
Moon leaves Penumbra	6 11 48.5	" "

First contact of Shadow with Moon's limb 79° from north point towards the East.

Last contact of Shadow with Moon's limb 32° from north point towards the West.

Magnitude of Eclipse = 0.812 (Moon's diameter = 1).

III. A Total Eclipse of the Sun, July 17, 1860, visible as a partial one at Washington, with the following elements:—

Washington Mean Time of  $\delta$  in Right Ascension, July 17 <sup>d. h. m. s.</sup> 21 0 44.4

Sun's and Moon's R.A.	<sup>h. m. s.</sup> 7 52 20.37	Hourly Motions	<sup>s.</sup> 10.04 and 149.94
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Sun's Declination	+20° 56' 58.6	Hourly Motion	— 0' 26.8
Moon's Declination	+21° 31' 6.9	“ “	— 9' 53.2
Sun's Equa. Hor. Par.	8.7	True Semidiameter	15' 46.7
Moon's Equa. Hor. Par.	59' 48.8	“ “	16' 19.5

From these elements may be deduced the following results:—

Eclipse begins on the Earth, July 17<sup>d</sup> 18<sup>h</sup> 46<sup>m</sup>.4, Washington mean time, in longitude 25° 22'.8 West of Washington, and in latitude 34° 40'.4 North.

Central Eclipse begins 19<sup>h</sup> 49<sup>m</sup>.8, in longitude 48° 53'.8 West of Washington, and in latitude 45° 40'.0 North.

Central Eclipse at noon 21<sup>h</sup> 0<sup>m</sup>.7, in longitude 318° 42'.2 West of Washington, and in latitude 56° 12'.4 North.

Central Eclipse ends 22<sup>h</sup> 46<sup>m</sup>.1, in longitude 243° 52'.5 West of Washington, and in latitude 15° 48'.2 North.

Eclipse ends on the Earth, July 17<sup>d</sup> 23<sup>h</sup> 49<sup>m</sup>.3, in longitude 263° 16'.5 West of Washington, and in latitude 4° 8'.9 North.

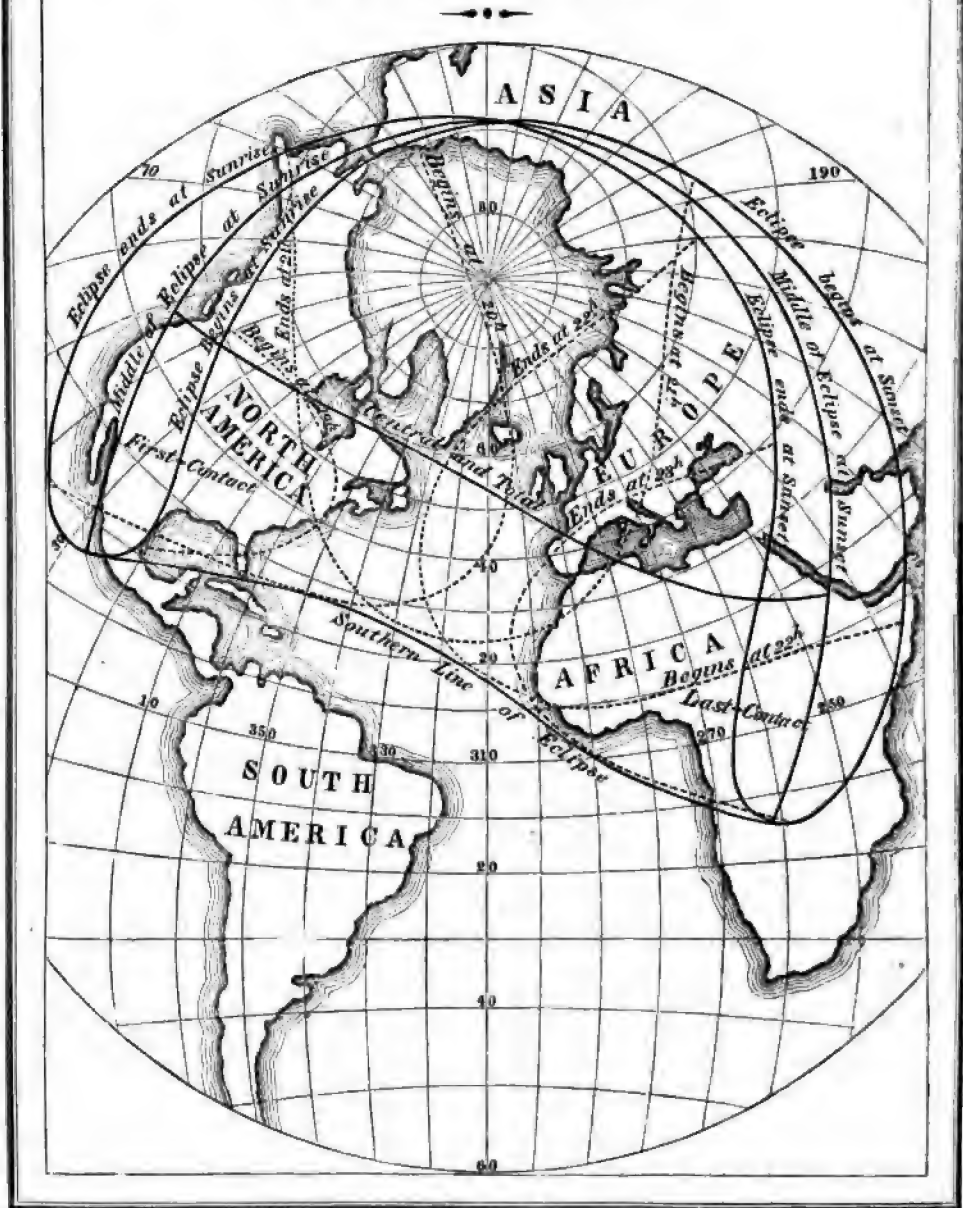
#### DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	μ
h. m.				9.97	9.96	+9.54	+9.55	
18 40	—1.27909	+1.48539	+0.41169	1019	9489	8388	8820	278° 31' 7.6
18 45	1.23365	1.47205	0.39835	1021	9490	8376	8808	279 46 7.8
18 50	1.18821	1.45871	0.38501	1022	9491	8365	8797	281 1 7.9
18 55	1.14277	1.44536	0.37167	1024	9493	8353	8785	282 16 8.1
19 0	1.09733	1.43201	0.35833	1026	9495	8341	8773	283 31 8.3
19 5	1.05189	1.41866	0.34498	1027	9496	8330	8762	284 46 8.4
19 10	1.00645	1.40531	0.33163	1029	9498	8318	8751	286 1 8.6
19 15	0.96101	1.39194	0.31828	1031	9500	8306	8739	287 16 8.8
19 20	0.91557	1.37858	0.30493	1032	9501	8295	8728	288 31 9.0
19 25	0.87013	1.36522	0.29157	1034	9503	8283	8716	289 46 9.2
19 30	0.82468	1.35185	0.27821	1036	9505	8271	8704	291 1 9.4
19 35	0.77924	1.33848	0.26485	1037	9506	8260	8693	292 16 9.5
19 40	0.73380	1.32511	0.25149	1039	9508	8248	8682	293 31 9.7
19 45	0.68836	1.31173	0.23812	1041	9510	8236	8670	294 46 9.9
19 50	0.64292	1.29835	0.22475	1042	9512	8224	8659	296 1 10.1
19 55	0.59748	1.28497	0.21138	1044	9514	8212	8647	297 16 10.3
20 0	0.55203	1.27159	0.19801	1046	9516	8200	8635	298 31 10.5
20 5	0.50659	1.25821	0.18463	1047	9517	8189	8624	299 46 10.6
20 10	0.46115	1.24482	0.17125	1049	9519	8177	8613	301 1 10.8
20 15	0.41571	1.23143	0.15787	1051	9521	8165	8601	302 16 11.0
20 20	0.37027	1.21804	0.14449	1052	9522	8154	8590	303 31 11.1
20 25	0.32483	1.20464	0.13111	1054	9524	8142	8578	304 46 11.3
20 30	0.27938	1.19124	0.11872	1056	9526	8130	8566	306 1 11.5
20 35	0.23394	1.17784	0.10533	1057	9527	8119	8555	307 16 11.6
20 40	0.18850	1.16444	0.09194	1059	9529	8107	8544	308 31 11.8
20 45	0.14305	1.15103	0.07855	1061	9531	8095	8532	309 46 12.0
20 50	0.09761	1.13762	0.06516	1062	9533	8083	8521	311 1 12.2
20 55	0.05217	1.12421	0.05176	1064	9535	8071	8509	312 16 12.4
21 0	—0.00672	1.11080	0.03736	1066	9537	8059	8497	313 31 12.6
21 5	+0.03872	1.09739	0.02396	1067	9538	8048	8486	314 46 12.7
21 10	0.08416	1.08397	+0.01056	1069	9540	8036	8475	316 1 12.9
21 15	0.12960	1.07055	—0.00285	1071	9542	8024	8463	317 16 13.1
21 20	0.17504	1.05713	0.01626	1072	9543	8012	8452	318 31 13.2
21 25	+0.22048	+1.04370	—0.02967	1074	9545	8000	8440	319 46 13.4



# TOTAL ECLIPSE

OF  
JULY 17. 1860.





## DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
h. m.				9.97	9.96	+9.54	+9.55	
21 30	+0.26593	+1.03027	-0.04308	1076	9547	7988	8428	321° 1' 13.6
21 35	0.31137	1.01684	0.05649	1077	9548	7977	8417	322 16 13.7
21 40	0.35681	1.00341	0.06991	1079	9550	7965	8406	323 31 13.9
21 45	0.40225	0.98997	0.08383	1081	9552	7953	8394	324 46 14.1
21 50	0.44769	0.97653	0.09675	1083	9553	7941	8383	326 1 14.3
21 55	0.49313	0.96309	0.11017	1085	9555	7929	8371	327 16 14.5
22 0	0.53857	0.94965	0.12359	1087	9557	7917	8359	328 31 14.7
22 5	0.58401	0.93621	0.13702	1088	9558	7906	8348	329 46 14.8
22 10	0.62945	0.92276	0.15045	1090	9560	7894	8337	331 1 15.0
22 15	0.67488	0.90931	0.16388	1092	9562	7882	8325	332 16 15.2
22 20	0.72032	0.89586	0.17731	1093	9563	7871	8314	333 31 15.3
22 25	0.76575	0.88240	0.19074	1095	9565	7859	8302	334 46 15.5
22 30	0.81118	0.86894	0.20418	1097	9567	7847	8290	336 1 15.7
22 35	0.85661	0.85548	0.21762	1098	9568	7836	8279	337 16 15.8
22 40	0.90204	0.84202	0.23106	1100	9570	7824	8267	338 31 16.0
22 45	0.94746	0.82855	0.24451	1102	9572	7812	8255	339 46 16.2
22 50	0.99289	0.81508	0.25795	1103	9574	7800	8244	341 1 16.3
22 55	1.03831	0.80161	0.27140	1105	9576	7788	8232	342 16 16.5
23 0	1.08373	0.78813	0.28485	1107	9578	7776	8220	343 31 16.7
23 5	1.12915	0.77465	0.29830	1108	9579	7765	8209	344 46 16.8
23 10	1.17457	0.76117	0.31176	1110	9581	7753	8197	346 1 17.0
23 15	1.21998	0.74769	0.32522	1112	9583	7741	8185	347 16 17.2
23 20	1.26539	0.73421	0.33868	1113	9584	7729	8174	348 31 17.3
23 25	1.31080	0.72072	0.35214	1115	9586	7717	8162	349 46 17.5
23 30	1.35621	0.70723	0.36561	1117	9588	7705	8150	351 1 17.7
23 35	1.40161	0.69374	0.37908	1118	9589	7694	8139	352 16 17.8
23 40	1.44701	0.68024	0.39255	1120	9591	7682	8127	353 31 18.0
23 45	1.49241	0.66674	0.40602	1122	9593	7670	8115	354 46 18.2
23 50	+1.53781	+0.65324	-0.41949	1124	9595	7658	8103	356 1 18.4

## FOR SHADOW.

Washington Mean Time.	B.	C.	Washington Mean Time.	B.	C.
h. m.			h. m.		
19 45	+0.76855	+0.78130	21 20	+0.51394	+0.52692
19 50	0.75517	0.76793	21 25	0.50052	0.51351
19 55	0.74179	0.75456	21 30	0.48709	0.50010
20 0	0.72841	0.74119	21 35	0.47366	0.48669
20 5	0.71502	0.72782	21 40	0.46023	0.47327
20 10	0.70163	0.71444	21 45	0.44679	0.45985
20 15	0.68824	0.70106	21 50	0.43335	0.44643
20 20	0.67485	0.68768	21 55	0.41991	0.43301
20 25	0.66146	0.67430	22 0	0.40647	0.41958
20 30	0.64806	0.66091	22 5	0.39302	0.40616
20 35	0.63466	0.64752	22 10	0.37957	0.39273
20 40	0.62126	0.63413	22 15	0.36612	0.37930
20 45	0.60785	0.62074	22 20	0.35267	0.36587
20 50	0.59444	0.60735	22 25	0.33922	0.35244
20 55	0.58103	0.59395	22 30	0.32576	0.33900
21 0	0.56762	0.58055	22 35	0.31230	0.32556
21 5	0.55420	0.56715	22 40	0.29883	0.31212
21 10	0.54078	0.55374	22 45	0.28536	0.29867
21 15	+0.52736	+0.54033	22 50	+0.27189	+0.28522



A,  $\mu$ , log E, and log F are given in the Table for Penumbra, and the values of log G and log H are obtained from the corresponding values for Penumbra by numerically increasing log G by 0.000028, and increasing log H by 0.000027.

IV. A Partial Eclipse of the Moon, July 31 and August 1, 1860, invisible at Washington, with the following elements: —

Washington Mean Time of  $\delta$  in Right Ascension, August 1 <sup>d. h. m. s.</sup> 0 50 45.1.

Sun's Right Ascension	<sup>h. m. s.</sup> 8 48 14.51	Hourly Motion	<sup>s.</sup> 9.69
Moon's Right Ascension	20 48 14.51	" "	119.57
Sun's Declination	+17° 51' 29".1	Hourly Motion	— 0 38.3
Moon's Declination	—17 7 7.0	" "	+10 47.6

Washington Mean Time of  $\delta$  in Longitude, July 1 <sup>d. h. m. s.</sup> 0 25 24.0.

Moon's Longitude	309° 35' 56".2	Hourly Motion	30' 25.2
Moon's Latitude	+0 41 36.9	" "	+2 47.1
Sun's Equa. Hor. Par.	8.5	True Semidiameter	15 48.2
Moon's Equa. Hor. Par.	54 49.3	" "	14 55.6

From these elements are deduced the following results: —

Moon enters Penumbra, July	<sup>d. h. m.</sup> 31 21 35.4	Washington Mean Time.	
Moon enters Shadow	31 23 0.6	" "	
Greatest Eclipse, August	1 0 16.6	" "	
Moon leaves Shadow	1 1 32.6	" "	
Moon leaves Penumbra	1 2 58.3	" "	

First contact of Shadow with Moon's limb 118° from north point towards the East.

Last contact of Shadow with Moon's limb 160° from north point towards the West.

Magnitude of the Eclipse = 0.443 (Moon's diameter = 1).



CHANGES OF THE QUANTITIES IN THE TABLES OF DATA FOR ECLIPSE  
OF JANUARY 22.

Washington Mean Time.	For one Minute.			For one Second.		
	A.	B.	C.	A'.	B'.	C'.
h. m.						
4 40	+8014.0	+2706.0	+2702.0	+133.57	+45.10	+45.03
4 55	8013.0	2706.0	2703.0	133.55	45.10	45.05
5 10	8013.0	2708.0	2704.0	133.55	45.13	45.07
5 25	8013.0	2709.0	2706.0	133.55	45.15	45.10
5 40	8013.0	2711.0	2707.0	133.55	45.18	45.12
5 55	8012.0	2711.0	2709.0	133.53	45.18	45.15
6 10	8012.0	2712.0	2710.0	133.53	45.20	45.17
6 25	8012.0	2714.0	2712.0	133.53	45.23	45.20
6 40	8012.0	2716.0	2713.0	133.53	45.27	45.22
6 55	8011.0	2717.0	2714.0	133.52	45.28	45.23
7 10	8010.0	2718.0	2716.0	133.50	45.30	45.27
7 25	8010.0	2719.0	2717.0	133.50	45.32	45.28
7 40	8010.0	2720.0	2718.0	133.50	45.33	45.30
7 55	8008.0	2722.0	2720.0	133.47	45.37	45.33
8 10	8008.0	2722.0	2721.0	133.47	45.37	45.35
8 25	8008.0	2724.0	2723.0	133.47	45.40	45.38
8 40	8007.0	2725.0	2724.0	133.45	45.42	45.40
8 55	8006.0	2726.0	2725.0	133.43	45.43	45.42
9 10	8006.0	2727.0	2726.0	133.43	45.45	45.43
9 25	8004.0	2727.0	2726.0	133.40	45.45	45.43
9 40	8004.0	2728.0	2727.0	133.40	45.47	45.45
9 55	+8004.0	+2730.0	+2728.0	+133.40	+45.50	+45.47

CHANGES OF THE QUANTITIES IN THE TABLES OF DATA FOR ECLIPSE  
OF JULY 17.

Washington Mean Time.	For one Minute.			For one Second.		
	A.	B.	C.	A'.	B'.	C'.
h. m.						
18 40	+9088.0	+2669.0	+2668.0	+151.47	+44.48	+44.47
18 55	9088.0	2670.0	2668.0	151.47	44.50	44.47
19 10	9088.0	2672.0	2670.0	151.47	44.53	44.50
19 25	9088.0	2673.0	2672.0	151.47	44.55	44.53
19 40	9088.0	2675.0	2673.0	151.47	44.58	44.55
19 55	9089.0	2676.0	2674.0	151.48	44.60	44.57
20 10	9088.0	2678.0	2676.0	151.47	44.63	44.60
20 25	9089.0	2680.0	2677.0	151.48	44.67	44.62
20 40	9089.0	2681.0	2678.0	151.48	44.68	44.63
20 55	9089.0	2682.0	2680.0	151.48	44.70	44.67
21 10	9088.0	2684.0	2681.0	151.47	44.73	44.68
21 25	9089.0	2686.0	2682.0	151.48	44.77	44.70
21 40	9088.0	2687.0	2684.0	151.47	44.78	44.73
21 55	9088.0	2688.0	2685.0	151.47	44.80	44.75
22 10	9087.0	2690.0	2686.0	151.45	44.83	44.77
22 25	9086.0	2692.0	2687.0	151.43	44.87	44.78
22 40	9085.0	2693.0	2689.0	151.42	44.88	44.82
22 55	9084.0	2695.0	2690.0	151.40	44.92	44.83
23 10	9083.0	2696.0	2692.0	151.38	44.93	44.87
23 25	9082.0	2698.0	2693.0	151.37	44.97	44.89
23 40	+9080.0	+2700.0	+2694.0	+151.34	+45.00	+44.90



ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		$H$	$Y$	$p'$	$q'$	Log $\sin D$	Log $\cos D$
Jan. 1	$\eta$ Piscium	4	+22	-61	h. m. 21 39.7	h. m. s. -8 58 24	-0.4121	0.5074	+2196	+9.4023	9.9857
2	B.A.C. 632	6	+33	-45	13 31.4	+6 23 49	-0.1833	.5183	+2012	+9.4801	.9792
3	$\epsilon$ Arietis	4½	+90	+36	14 58.7	+7 0 7	+1.1476	.5508	+1639	+9.5500	.9708
4	7 Tauri	6	+45	-26	5 59.0	-2 32 6	+0.0200	.5674	+1326	+9.6090	.9608
4	11 Tauri	6	+12	-57	8 35.3	-0 1 34	-0.5563	.5702	+1262	+9.6238	.9577
4	$g$ Pleiadum	5½	+90	+12	10 16.3	+1 35 39	+0.7178	.5716	+1226	+9.6068	.9612
4	$b$ Pleiadum	4½	+90	+23	10 18.3	+1 37 36	+0.9042	.5716	+1225	+9.6037	.9618
4	$m$ Pleiadum	7	+53	-17	10 24.4	+1 43 25	+0.1632	.5717	+1223	+9.6161	.9594
4	$\epsilon$ Tauri	5	+81	+3	10 26.0	+1 44 58	+0.5520	.5717	+1223	+9.6098	.9607
4	$c$ Pleiadum	5	+90	+10	10 41.4	+1 59 47	+0.6845	.5719	+1217	+9.6080	.9610
4	$k$ Pleiadum	7½	+79	+2	10 43.1	+2 1 29	+0.5288	.5719	+1217	+9.6113	.9603
4	$l$ Pleiadum	7½	+79	+2	10 46.6	+2 4 50	+0.5319	.5720	+1212	+9.6108	.9604
4	$d$ Pleiadum	5	+90	+41	10 54.3	+2 12 12	+1.1437	.5721	+1213	+9.6009	.9624
4	12 Pleiadum	7½	+85	+5	11 10.9	+2 28 11	+0.5803	.5722	+1207	+9.6107	.9604
4	$p$ Tauri	7½	+90	+31	11 19.2	+2 36 10	+1.0162	.5724	+1204	+9.6039	.9618
4	$\eta$ Tauri	3½	+90	+32	11 22.5	+2 39 19	+1.0337	.5724	+1203	+9.6036	.9618
4	$f$ Pleiadum	4½	+90	+43	12 3.8	+3 19 5	+1.1641	.5729	+1188	+9.6029	.9620
4	$h$ Pleiadum	5½	+90	+33	11 43.8	+2 59 49	+1.0394	.5733	+1187	+9.6046	.9617
4	B.A.C. 1192	6½	+23	-45	12 30.0	+3 44 18	-0.3677	.5752	+1165	+9.6284	.9567
5	$\varphi$ Tauri	5	-22	-63	0 29.3	-5 44 19	-1.0681	.5863	+0853	+9.6573	.9498
5	$\chi$ Tauri	5½	+90	+19	1 24.1	-4 51 37	+0.7754	.5856	+0825	+9.6308	.9562
6	B.A.C. 1746	6½	+50	-8	5 16.3	-5 7 59	+0.1160	.6026	-0017	+9.6581	.9496
6	136 Tauri	5	+17	-42	11 43.5	+1 2 57	-0.4753	.6044	-0233	+9.6655	.9477
6	139 Tauri	5½	+90	+47	13 30.0	+2 44 56	+1.1301	.6045	-0292	+9.6408	.9539
7	$\epsilon$ Geminor.	3½	+90	+23	6 28.9	-4 59 24	+0.8304	.6048	-0841	+9.6303	.9563
7	37 Geminor.	6	+53	-14	10 41.9	-0 57 6	+0.1683	.6045	-0973	+9.6348	.9558
7	$\omega$ Geminor.	6	+90	-34	13 22.0	+1 36 12	+1.0266	.6032	-1047	+9.6163	.9594
7	48 Geminor.	6	+90	+10	17 6.8	+5 11 35	+0.6610	.6020	-1167	+9.6153	.9595
7	52 Geminor.	6	+32	-35	17 56.1	+5 58 52	-0.1940	.6016	-1192	+9.6279	.9569
8	$\mu^3$ Cancri	5	+39	-34	14 14.1	+1 26 49	-0.0988	.5909	-1752	+9.5733	.9672
8	B.A.C. 2854	6½	+87	0	23 41.6	+10 31 44	+0.6298	.5840	-1980	+9.5225	.9745
9	$\eta$ Cancri	6	-6	-69	0 4.4	+10 53 37	-0.8823	.5838	-1986	+9.5525	.9704
9	39 Cancri	6	-19	-70	3 2.2	-10 15 34	-1.0713	.5817	-2051	+9.5543	.9702
9	40 Cancri	6	-17	-70	3 4.3	-10 13 29	-1.0430	.5817	-2051	+9.5434	.9717
9	B.A.C. 2919	7	+1	-67	3 9.0	-10 9 1	-0.7614	.5817	-2052	+9.5374	.9726
9	$\epsilon$ Cancri	6½	+8	-68	3 10.9	-10 7 9	-0.6448	.5817	-2053	+9.5347	.9729
9	42 Cancri	6½	+3	-70	3 17.3	-10 1 1	-0.8395	.5817	-2054	+9.5383	.9724
9	B.A.C. 2925	6½	+4	-70	3 22.7	-9 55 49	-0.7213	.5813	-2060	+9.5355	.9728
9	B.A.C. 2931	7	-9	-70	3 43.9	-9 36 27	-0.9226	.5813	-2065	+9.5382	.9724
9	$\delta$ Cancri	4	+65	-17	4 54.6	-8 27 31	+0.3471	.5804	-2254	+9.5052	.9765
9	$\pi^3$ Cancri	6	+90	-2	17 27.9	+3 37 7	+0.6758	.5706	-2378	+9.4274	.9839
10	A Leonis	5	+36	-48	16 3.7	+1 23 40	-0.1561	.5547	-2613	+9.2680	.9924
11	$d$ Leonis	5	+28	-59	15 47.8	+0 18 46	-0.2885	.5419	-2752	+8.8816	.9987
11	$\rho^3$ Leonis	6	+74	-17	18 45.1	+3 10 12	+0.5120	.5405	-2757	+8.6798	9.9995
12	$\nu$ Leonis	4½	+16	-76	8 41.9	-7 20 46	-0.5368	.5360	-2755	-6.9682	0.0000
13	$\chi$ Virginis	5	-27	-90	14 2.0	-2 58 4	-1.2020	.5335	-2599	-9.0997	9.9965
13	B.A.C. 4259	6	-26	-90	14 5.8	-2 54 28	-1.1806	.5335	-2598	-9.1017	.9965
14	75 Virginis	6	+49	-32	15 3.4	-2 45 54	.5379	.5379	-2319	-9.4028	.9857
14	89 Virginis	5½	+73	+47	22 52.2	+4 47 18	+1.3381	.5398	-2304	-9.4765	.9796
16	42 Libræ	5½	-33	-90	23 54.3	+4 7 44	-1.0558	.5569	-1338	-9.5983	.9629
17	$b$ Scorpii	5	+52	-16	4 28.5	+8 32 5	+0.4877	.5583	-1126	-9.6312	.9561
17	A Scorpii	5	+20	-48	5 37.1	+9 38 14	-0.0823	.5586	-1100	-9.6244	.9576
17	$\pi$ Scorpii	3½	+54	-13	7 50.9	+11 47 13	+0.5317	.5591	-1046	-9.6372	.9548
17	B.A.C. 5347	5	+45	-21	11 48.5	-8 23 42	+0.3946	.5601	-0947	-9.6411	.9538
17	$\sigma$ Scorpii	3½	-23	-90	17 25.0	-2 59 27	-0.8553	0.5715	-0818	-9.6300	9.9564



ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.							
			North-ern.	South-ern.		$H$	$Y$	$p'$	$q'$	Log sin $D$	Log cos $D$		
			$^{\circ}$	$^{\circ}$	$h. m.$	$h. m. s.$							
Jan. 17	$\alpha$ Scorpii	1 $\frac{1}{2}$	+11	-54	20 53.8	+ 0 21 51	-0.1847	0.5720	-0.732	-9.6437	9.9532		
18	A Ophiuchi	5	-26	-90	16 28.0	- 4 46 39	-0.7965	.5627	-0.0204	-9.6478	.9522		
18	43 Ophiuchi	6	+62	+10	19 48.0	- 1 33 58	+0.8855	.5625	-0.119	-9.6716	.9459		
19	3 Sagittarii	5	+57	- 5	6 9.5	+ 8 25 4	+0.6589	.5608	+0.0151	-9.6684	.9469		
19	B.A.C. 6194	5 $\frac{1}{2}$	+38	-24	19 22.4	- 2 50 24	+0.3443	.5572	+0.0492	-9.6584	.9496		
19	2 Sagittarii	3	-47	-90	23 45.7	+ 1 23 36	-1.1545	.5556	+0.0600	-9.6339	.9555		
24	2 Capricor.	5 $\frac{1}{2}$	-15	-90	0 30.9	- 0 55 0	-1.0209	.4893	+0.2247	-9.3182	.9904		
24	8 Aquarii	4 $\frac{1}{2}$	-19	-90	17 12.6	- 8 41 1	-1.0844	.4940	+0.2370	-9.1685	.9952		
24	9 Aquarii	5 $\frac{1}{2}$	-10	-81	19 5.4	- 6 51 18	-0.5897	.4933	+0.2382	-9.1710	9.9952		
26	$\pi$ Piscium	4 $\frac{1}{2}$	-26	-90	8 57.4	+ 6 0 4	-1.2927	.4863	+0.2500	-7.9321	0.0000		
26	9 Piscium	6	-17	-90	9 8.3	+ 6 10 38	-1.0967	.4863	+0.2500	+7.7911	0.0000		
26	2 Piscium	5	+59	-28	17 35.4	- 9 35 44	+0.2903	.4867	+0.2501	+8.2463	9.9999		
29	7 Piscium	4	+26	-56	5 28.9	+ 0 38 33	-0.3318	.5092	+0.2201	+9.4022	.9857		
29	101 Piscium	6	+90	+10	7 42.1	+ 2 47 46	+0.8919	.5104	+0.2180	+9.3822	.9870		
29	105 Piscium	6	+15	-70	9 40.4	+ 4 42 34	-0.5816	.5117	+0.2159	+9.4322	.9835		
30	$\epsilon$ Arietis	4 $\frac{1}{2}$	+90	+46	23 52.1	- 6 18 34	+1.2397	.5435	+0.1613	+9.5499	.9708		
31	7 Tauri	6	+48	-22	15 19.5	+ 8 36 29	+0.0853	.5576	+0.1301	+9.6092	.9608		
31	9 Pleiadum	5 $\frac{1}{2}$	+90	+16	19 44.8	-11 7 51	+0.7901	.5619	+0.1198	+9.6068	.9612		
31	b Pleiadum	4 $\frac{1}{2}$	+90	+28	19 46.9	-11 5 50	+0.9793	.5619	+0.1197	+9.6037	.9618		
31	m Pleiadum	7	+57	-14	19 48.9	-11 3 55	+0.2200	.5619	+0.1196	+9.6161	.9594		
31	$\epsilon$ Tauri	5	+88	+ 7	19 54.8	-10 58 13	+0.6229	.5619	+0.1194	+9.6098	.9607		
31	1 Pleiadum	8	+90	+36	20 1.2	-10 52 4	+1.0882	.5619	+0.1192	+9.6024	.9621		
31	2 Pleiadum	8 $\frac{1}{2}$	+90	+ 8	20 4.1	-10 49 18	+0.6434	.5620	+0.1192	+9.6097	.9607		
31	4 Pleiadum	8	+90	+15	20 5.7	-10 47 46	+0.7809	.5620	+0.1191	+9.6076	.9611		
31	c Pleiadum	5	+90	+15	20 10.6	-10 43 1	+0.7567	.5620	+0.1191	+9.6082	.9610		
31	7 Pleiadum	8	+90	+37	20 11.9	-10 41 44	+1.1043	.5620	+0.1191	+9.6024	.9621		
31	k Pleiadum	7 $\frac{1}{2}$	+83	+ 4	20 12.0	-10 41 13	+0.5627	.5621	+0.1190	+9.6113	.9603		
31	l Pleiadum	7 $\frac{1}{2}$	+82	+ 4	20 16.0	-10 37 48	+0.5630	.5622	+0.1188	+9.6108	.9604		
31	9 Pleiadum	8 $\frac{1}{2}$	+90	+27	20 22.0	-10 31 59	+0.9645	.5623	+0.1186	+9.6051	.9616		
31	d Pleiadum	5	+90	+49	20 23.9	-10 30 10	+1.2218	.5623	+0.1185	+9.6009	.9624		
31	10 Pleiadum	8	+90	+22	20 36.7	-10 27 29	+0.9049	.5624	+0.1184	+9.6063	.9613		
31	11 Pleiadum	8 $\frac{1}{2}$	+90	+35	20 32.1	-10 22 21	+1.0742	.5625	+0.1182	+9.6036	.9618		
31	12 Pleiadum	7 $\frac{1}{2}$	+90	+ 8	20 40.0	-10 14 42	+0.6513	.5627	+0.1178	+9.6107	.9604		
31	13 Pleiadum	8 $\frac{1}{2}$	+90	+47	20 42.7	-10 12 6	+1.2070	.5628	+0.1177	+9.6018	.9622		
31	15 Pleiadum	8 $\frac{1}{2}$	+90	+35	20 47.7	-10 7 14	+1.0770	.5629	+0.1175	+9.6041	.9617		
31	18 Pleiadum	8	+90	+35	20 48.9	-10 6 9	+1.0676	.5629	+0.1174	+9.6043	.9617		
31	p Pleiadum	7 $\frac{1}{2}$	+90	+35	20 49.6	-10 5 24	+1.0932	.5629	+0.1174	+9.6039	.9618		
31	20 Pleiadum	8	+86	+ 6	20 50.2	-10 4 50	+0.5980	.5629	+0.1174	+9.6119	.9602		
31	21 Pleiadum	8 $\frac{1}{2}$	+79	+ 2	20 51.3	-10 3 48	+0.5283	.5629	+0.1173	+9.6132	.9600		
31	24 Pleiadum	8	+90	+24	20 52.9	-10 2 13	+0.9179	.5630	+0.1172	+9.6069	.9612		
31	7 Tauri	3 $\frac{1}{2}$	+90	+38	20 53.0	-10 2 9	+1.1105	.5630	+0.1172	+9.6037	.9618		
31	27 Pleiadum	8 $\frac{1}{2}$	+90	+25	21 11.5	- 9 44 22	+0.9200	.5630	+0.1165	+9.6074	.9611		
31	29 Pleiadum	8	+90	+23	21 19.4	- 9 37 42	+0.9029	.5630	+0.1164	+9.6079	.9611		
31	f Pleiadum	4 $\frac{1}{2}$	+90	+51	21 35.5	- 9 21 15	+1.2417	.5633	+0.1157	+9.6028	.9620		
31	h Pleiadum	5 $\frac{1}{2}$	+90	+42	21 36.0	- 9 20 42	+1.1556	.5633	+0.1157	+9.6042	.9617		
31	31 Pleiadum	8	+90	+22	21 38.0	- 9 18 47	+0.8861	.5633	+0.1156	+9.6087	.9608		
31	32 Pleiadum	8	+90	+25	21 40.1	- 9 16 45	+0.9059	.5634	+0.1155	+9.6085	.9609		
31	33 Pleiadum	8 $\frac{1}{2}$	+90	+33	21 42.1	- 9 14 51	+1.0464	.5634	+0.1154	+9.6063	.9613		
31	35 Pleiadum	9	+90	+35	21 50.6	- 9 6 41	+1.0686	.5635	+0.1151	+9.6062	.9613		
31	36 Pleiadum	9	+90	+37	21 54.3	- 9 3 6	+1.1033	.5636	+0.1150	+9.6057	.9613		
31	37 Pleiadum	8	+90	+28	21 54.9	- 9 2 34	+0.9660	.5636	+0.1150	+9.6080	.9610		
31	B.A.C. 1193	6 $\frac{1}{2}$	+26	-41	22 2.6	- 8 55 7	-0.3111	.5637	+0.1146	+9.6284	.9610		
31	39 Pleiadum	8	+90	+19	22 7.8	- 8 50 3	+0.8360	.5638	+0.1144	+9.6104	.9610		
Feb. 1	p Tauri	6	+29	-36	6 32.3	- 0 44 28	-0.2565	.5717	+0.0933	+9.6237	.9610		
1	q Tauri	5	-19	-63	10 23.6	+ 2 58 5	-1.0242	0.5750	+0.0829	+9.6279	.9610		



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PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	P'	q'	Log sin D	Log cos D
			°	°	h. m.	h. m. s.					
Feb. 1	χ Tauri	5½	+90	+23	11 20.1	+ 3 52 24	+0.8396	0.5753	+0.0819	+9.6308	9.9562
2	136 Tauri	5	+18	-42	22 33.4	-10 18 57	-0.4588	.5970	-.0235	+9.6655	.9477
3	139 Tauri	5½	+90	+49	0 22.1	- 8 34 43	+1.1439	.5977	-.0294	+9.6408	.9539
3	ε Geminor.	3½	+90	+24	17 38.8	+ 7 58 43	+0.8590	.6001	-.0839	+9.6303	.9563
4	A Geminor.	5½	- 1	-65	8 32.6	- 1 44 32	-0.7798	.5970	-.1296	+9.6311	.9561
5	μ² Cancri	5	+38	-35	1 35.5	- 9 27 26	-0.0918	.5905	-.1762	+9.5734	.9672
5	δ Cancri	4	+64	-16	16 10.7	+ 4 36 56	+0.3463	.5829	-.2094	+9.5052	.9765
6	18 Leonis	6	+73	-14	17 32.4	+ 5 0 40	+0.4832	.5679	-.2547	+9.3336	.9897
6	B.A.C. 3345	6	+90	- 1	18 2.2	+ 5 29 21	+0.7269	.5675	-.2553	+9.3203	.9903
7	A Leonis	5	+34	-49	2 41.6	-10 10 25	-0.1678	.5625	-.2653	+9.2678	.9924
8	d Leonis	5	+28	-60	1 42.6	-11 58 20	-0.3024	.5523	-.2807	+8.8814	9.9987
8	v Leonis	4½	+15	-77	18 0.9	+ 3 46 10	-0.5507	.5498	-.2827	-6.9792	0.0000
11	χ Virginis	5	-27	-90	22 14.8	+ 7 2 31	-1.2009	.5440	-.2650	-9.0997	9.9965
11	89 Virginis	5½	+73	+41	5 56.5	-10 20 54	+1.2996	.5485	-.2238	-9.4766	.9796
12	B.A.C. 4984	6	+67	+ 6	16 49.0	- 0 42 4	+0.8560	.5573	-.1547	-9.5998	.9626
13	42 Libræ	5½	-33	-90	5 50.1	+11 50 54	-1.0561	.5603	-.1242	-9.5983	.9628
13	δ Scorpil	5	+51	-17	10 20.5	- 7 48 32	+0.4752	.5608	-.1134	-9.6312	.9561
13	A Scorpil	5	+20	-48	11 28.2	- 6 43 14	-0.0900	.5610	-.1099	-9.6244	.9576
13	π Scorpil	3½	+53	-14	13 40.4	- 4 35 52	+0.5200	.5616	-.1047	-9.6373	.9548
13	B.A.C. 5347	5	+44	-22	17 35.5	- 0 49 22	+0.3850	.5619	-.0947	-9.6411	.9538
13	α Scorpil	3½	-23	-90	23 8.8	+ 4 31 47	-0.8412	.5622	-.0808	-9.6301	.9564
14	α Scorpil	1½	+11	-54	2 36.1	+ 7 51 27	-0.1862	.5625	-0.0715	-9.6437	.9532
14	A Ophiuchi	5	-25	-90	22 5.6	+ 2 38 20	-0.7978	.5615	-.0215	-9.6478	.9522
15	3 Sagittarii	5	+56	- 6	11 47.7	- 8 9 25	+0.6555	.5586	+0.0153	-9.6684	.9469
16	B.A.C. 6194	5½	+38	-24	1 3.4	+ 4 37 58	+0.3436	.5545	+0.0496	-9.6585	.9496
16	λ Sagittarii	3	-47	-90	5 28.1	+ 8 53 21	-1.1545	.5523	+0.0599	-9.6339	.9555
16	φ Sagittarii	3½	+63	+34	13 16.3	- 7 34 42	+1.1682	.5492	+0.0778	-9.6590	.9494
16	σ Sagittarii	2½	+64	+ 3	17 36.9	- 3 23 10	+0.8039	.5468	+0.0883	-9.6490	.9519
17	ψ Sagittarii	5	+62	- 7	2 52.7	+ 5 33 51	+0.6521	.5420	+0.1086	-9.6338	.9555
17	χ¹ Sagittarii	5½	+46	-22	7 23.9	+ 9 55 59	+0.3797	.5395	+0.1186	-9.6223	.9581
18	v Capricor.	5½	-13	-90	19 46.7	- 2 50 35	-0.8658	.5183	+0.1829	-9.5044	9.9766
22	κ Piscium	4½	-39	-90	15 6.7	-10 3 14	-1.3344	.4883	+0.2505	+7.9320	0.0000
22	λ Piscium	5	+57	-30	23 43.0	- 1 40 38	+0.2456	.4886	+0.2505	+8.2462	9.9999
23	22 Piscium	6	+65	-24	5 19.6	+ 3 47 0	+0.3812	.4891	+0.2500	+8.5749	.9997
25	η Piscium	4	+22	-61	11 40.2	+ 8 37 21	-0.4111	.5143	+0.2220	+9.4022	.9857
27	ε Arietis	4½	+90	+38	6 39.3	+ 2 16 14	+1.1695	.5385	+0.1593	+9.5498	.9708
28	γ Pleiadum	5½	+90	+12	3 1.4	- 2 3 35	+0.7173	.5545	+0.1183	+9.6068	.9612
28	δ Pleiadum	4½	+90	+23	3 3.5	- 2 1 32	+0.9076	.5545	+0.1182	+9.6037	.9618
28	μ Pleiadum	7	+52	-18	3 10.0	- 1 55 18	+0.1461	.5546	+0.1179	+9.6161	.9594
28	ε Tauri	5	+81	+ 3	3 11.6	- 1 53 45	+0.5456	.5546	+0.1178	+9.6097	.9607
28	1 Pleiadum	8	+90	+40	3 18.3	- 1 47 21	+1.1347	.5546	+0.1175	+9.6022	.9621
28	2 Pleiadum	8½	+83	+ 4	3 21.2	- 1 44 29	+0.5667	.5547	+0.1173	+9.6097	.9607
28	3 Pleiadum	9	+90	+28	3 22.2	- 1 43 30	-0.9734	.5547	+0.1172	+9.6032	.9620
28	4 Pleiadum	8	+90	+11	3 22.9	- 1 42 55	+0.7058	.5547	+0.1171	+9.6076	.9611
28	5 Pleiadum	9	+68	- 5	3 23.5	- 1 42 19	+0.3968	.5548	+0.1171	+9.6125	.9601
28	6 Pleiadum	9	+90	+15	3 24.5	- 1 41 18	+0.7623	.5548	+0.1171	+9.6068	.9612
28	α Pleiadum	5	+90	+10	3 27.9	- 1 38 2	+0.6784	.5548	+0.1170	+9.6081	.9610
28	7 Pleiadum	8	+90	+32	3 29.3	- 1 36 40	+1.0330	.5549	+0.1170	+9.6024	.9621
28	κ Pleiadum	7½	+75	0	3 29.8	- 1 36 12	+0.4855	.5549	+0.1169	+9.6113	.9603
28	ι Pleiadum	7½	+78	+ 2	3 33.5	- 1 32 40	+0.5212	.5549	+0.1168	+9.6108	.9604
28	9 Pleiadum	8½	+90	+23	3 39.7	- 1 26 41	+0.8921	.5550	+0.1165	+9.6051	.9616
28	d Pleiadum	5	+90	+42	3 41.6	- 1 24 49	+1.1529	.5550	+0.1164	+9.6009	.9624
28	10 Pleiadum	8	+90	+19	3 44.5	- 1 22 4	+0.8314	.5550	+0.1164	+9.6062	.9613
28	11 Pleiadum	8½	+90	+30	3 49.9	- 1 16 49	+1.0028	.5551	+0.1162	+9.6036	.9618
28	12 Pleiadum	7½	+83	+ 4	3 58.1	- 1 8 55	+0.5744	0.5551	+0.1159	+9.6107	9.9604



## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Feb. 28	13 Pleiadum	8½	+90	+40	4 0.9	— 1 6 16	+1.1374	0.5551	+1.158	+9.6018	9.9622
28	15 Pleiadum	8½	+90	+30	4 6.1	— 1 1 16	+1.0055	.5552	+1.156	+9.6041	.9618
28	18 Pleiadum	8	+90	+29	4 7.2	— 1 0 8	+0.9959	.5552	+1.155	+9.6043	.9617
28	p Pleiadum	7½	+90	+31	4 8.0	— 0 59 23	+1.0216	.5552	+1.155	+9.6039	.9618
28	20 Pleiadum	8	+78	+1	4 8.7	— 0 58 44	+0.5202	.5552	+1.155	+9.6119	.9602
28	22 Pleiadum	8	+90	+51	4 9.7	— 0 57 44	+1.2362	.5552	+1.155	+9.6006	.9625
28	21 Pleiadum	8½	+72	— 2	4 9.7	— 0 57 43	+0.4497	.5552	+1.155	+9.6131	.9600
28	24 Pleiadum	8	+90	+20	4 11.4	— 0 56 6	+0.8445	.5552	+1.154	+9.6069	.9612
28	γ Tauri	3½	+90	+33	4 11.5	— 0 56 0	+1.0399	.5552	+1.154	+9.6037	.9618
28	27 Pleiadum	8½	+90	+20	4 30.5	— 0 37 44	+0.8470	.5554	+1.147	+9.6074	.9611
28	29 Pleiadum	8	+90	+19	4 37.6	— 0 30 51	+0.8312	.5554	+1.145	+9.6079	.9610
28	f Pleiadum	4½	+90	+44	4 55.2	— 0 13 52	+1.1735	.5556	+1.138	+9.6028	.9620
28	λ Pleiadum	5½	+90	+36	4 55.7	— 0 13 22	+1.0859	.5556	+1.138	+9.6043	.9617
28	31 Pleiadum	8	+90	+18	4 57.8	— 0 11 24	+0.8130	.5557	+1.138	+9.6088	.9608
28	32 Pleiadum	8	+90	+19	4 59.9	— 0 9 18	+0.8329	.5557	+1.137	+9.6085	.9609
28	33 Pleiadum	8½	+90	+29	5 2.0	— 0 7 21	+0.9784	.5558	+1.136	+9.6062	.9613
28	35 Pleiadum	9	+90	+30	5 10.7	+ 0 1 5	+0.9979	.5560	+1.133	+9.6062	.9613
28	36 Pleiadum	9	+90	+32	5 14.5	+ 0 4 44	+1.0332	.5561	+1.131	+9.6057	.9615
28	37 Pleiadum	8	+90	+23	5 15.0	+ 0 5 16	+0.8937	.5561	+1.131	+9.6079	.9610
28	B.A.C. 1192	6½	+21	—47	5 23.0	+ 0 12 55	—0.4013	.5563	+1.127	+9.6284	.9567
28	39 Pleiadum	8	+90	+15	5 28.4	+ 0 18 9	+0.7619	.5564	+1.125	+9.6104	.9605
28	φ Tauri	5	—29	—63	18 6.5	—11 31 17	—1.1241	.5655	+0.823	+9.6573	.9498
28	χ Tauri	5½	+90	+19	19 4.8	—10 35 6	+0.7668	.5662	+0.798	+9.6308	.9562
Mar. 1	136 Tauri	5	+13	—47	7 32.8	+ 0 28 24	—0.5299	.5855	—0.228	+9.6655	.9477
1	139 Tauri	5½	+90	+47	9 52.2	+ 2 16 16	+1.1138	.5856	—0.285	+9.6408	.9539
2	♈ Geminor.	3½	+90	+21	3 20.2	— 4 31 45	+0.7998	.5879	—0.812	+9.6303	.9563
2	37 Geminor.	6	+51	—16	7 45.5	— 0 17 5	+0.1238	.5882	—0.948	+9.6348	.9553
2	ω Geminor.	6	+90	+31	10 33.1	+ 2 33 43	+0.9984	.5879	—1.038	+9.6162	.9594
2	48 Geminor.	6	+88	+ 8	14 27.8	+ 6 9 3	+0.6243	.5875	—1.144	+9.6153	.9595
2	Δ Geminor.	5½	— 6	—65	18 45.5	+10 16 22	—0.8557	.5869	—1.263	+9.6311	.9561
3	μ² Cancri	5	+35	—38	12 18.6	+ 3 7 54	—0.1460	.5837	—1.729	+9.5733	.9672
3	η Cancri	6	— 9	—69	22 21.0	—11 13 15	—0.9305	.5785	—1.961	+9.5527	.9704
3	35 Cancri	6½	+27	—49	23 25.4	—10 11 17	—0.3025	.5780	—1.992	+9.5354	.9728
4	B.A.C. 2899	7	+32	—44	0 29.3	— 9 9 50	—0.2029	.5774	—2.015	+9.5288	.9737
4	B.A.C. 2906	7½	+ 5	—70	0 57.4	— 8 42 50	—0.7069	.5774	—2.024	+9.5374	.9725
4	38 Cancri	7	— 5	—70	1 11.9	— 8 28 53	—0.8580	.5774	—2.029	+9.5396	.9722
4	B.A.C. 2914	7	+ 8	—68	1 16.2	— 8 24 44	—0.6446	.5774	—2.031	+9.5348	.9729
4	39 Cancri	6	—23	—70	1 21.3	— 8 19 50	—1.1189	.5773	—2.032	+9.5443	.9716
4	40 Cancri	6	—21	—70	1 23.5	— 8 17 44	—1.0899	.5773	—2.033	+9.5435	.9717
4	B.A.C. 2919	7	— 1	—70	1 28.2	— 8 13 15	—0.8070	.5772	—2.034	+9.5374	.9726
4	♈ Cancri	6½	+ 6	—70	1 30.1	— 8 11 20	—0.6896	.5772	—2.035	+9.5347	.9729
4	42 Cancri	6½	— 6	—70	1 36.6	— 8 5 8	—0.8851	.5771	—2.037	+9.5384	.9724
4	B.A.C. 2925	6½	+ 1	—66	1 42.1	— 7 59 53	—0.7659	.5771	—2.039	+9.5355	.9728
4	B.A.C. 2931	7	—12	—70	2 3.5	— 7 39 14	—0.9680	.5770	—2.046	+9.5382	.9724
4	44 Cancri	7½	+71	—10	2 87.3	— 7 6 45	+0.4545	.5766	—2.059	+9.5049	.9766
4	δ Cancri	4	+61	—18	3 15.1	— 6 30 27	+0.3080	.5761	—2.069	+9.5052	.9765
4	π² Cancri	6	+67	— 4	15 52.0	+ 5 37 46	+0.6378	.5711	—2.318	+9.4274	.9839
5	B.A.C. 3345	6	+90	— 2	5 28.8	— 5 15 44	+0.7125	.5652	—2.533	+9.3204	.9903
5	Δ Leonis	5	+34	—50	14 10.7	+ 3 7 8	—0.1730	.5622	—2.638	+9.2677	.9924
6	d Leonis	5	+29	—58	13 6.7	+ 1 14 7	—0.2783	.5553	—2.808	+8.8813	.9981
6	ε² Leonis	6	+74	—17	15 56.3	+ 3 57 42	+0.5098	.5546	—2.818	+8.6801	.9983
7	υ Leonis	4½	+17	—73	5 11.3	— 7 15 6	—0.5006	.5528	—2.829	+8.9860	.9983
8	χ Virginis	5	—20	—90	8 45.0	— 4 39 7	—1.1094	.5535	—2.685	+9.0998	.9983
8	ψ Virginis	5	—43	—90	15 22.8	+ 1 44 38	—1.3341	.5544	—2.615	+9.1828	.9983
11	δ Scorpii	5	+59	— 9	18 2.5	+ 1 41 13	+0.6036	0.5703	—1.147	+9.6212	.9983



ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of Conj.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Mar. 11	A Scorpii	5	+27	0	h. m. s.	h. m. s.					
11	π Scorpii	3½	+61	-7	19 8.3	+ 2 44 28	+0.0475	.5702	-.1120	-9.6244	9.9576
12	B.A.C. 5347	5	+52	-14	21 16.5	+ 4 47 53	+0.6486	.5706	-.1065	-9.6372	.9548
12	σ Scorpii	3½	+14	-90	1 4.8	+ 8 27 33	+0.5178	.5723	-.0966	-9.6411	.9538
12	α Scorpii	1½	+18	-46	6 28.8	-10 20 33	-.06910	.5704	-.0814	-9.6301	.9564
12	α Scorpii	1½	+18	-46	9 50.6	- 7 6 25	-.0445	.5702	-.0725	-9.6437	.9532
13	A Ophiuchi	5	-17	-90	4 53.1	+11 13 18	-.06473	.5678	-.0208	-9.6478	.9522
13	3 Sagittarii	5	+63	+ 3	18 20.3	+ 0 10 44	+0.7901	.5631	+0.149	-9.6684	.9469
14	B.A.C. 6194	5½	+46	-16	7 25.1	-11 42 54	+0.4783	.5668	+0.0507	-9.6584	.9496
14	λ Sagittarii	3	-36	-90	11 46.8	- 7 0 30	-1.0076	.5646	+0.0596	-9.6339	.9555
14	σ Sagittarii	2½	+64	+12	23 49.2	+ 4 36 39	+0.9335	.5479	+0.0879	-9.6490	.9519
15	ψ Sagittarii	5	+65	+ 2	9 1.8	-10 29 39	+0.7798	.5424	+0.1080	-9.6339	.9555
15	χ¹ Sagittarii	5½	+54	-15	13 31.8	- 6 8 40	+0.5063	.5395	+0.1178	-9.6223	.9581
17	ν Capricor.	5½	- 6	-90	1 53.3	+ 5 3 39	-.07598	.5168	+0.1813	-9.5043	.9767
17	δ Capricor.	4	+72	+ 3	15 12.5	- 6 1 9	+0.8459	.5097	+0.1992	-9.4850	.9787
18	λ Capricor.	5½	-13	-90	12 57.0	- 8 53 56	-.0683	.4996	+0.2224	-9.3182	.9904
19	δ Aquarii	4½	-18	-90	5 39.5	+ 7 20 47	-1.0687	.4941	+0.2354	-9.1685	.9952
19	ε Aquarii	5½	+12	-79	7 32.1	+ 9 10 24	-.05720	.4935	+0.2365	-9.1710	.9952
23	η Piscium	4	+15	-68	17 20.6	- 7 54 54	-.05352	.5114	+0.2196	-9.4022	.9857
25	α Arietis	4½	+90	+25	12 11.5	+ 9 35 46	+0.9965	.5398	+0.1590	-9.5499	.9708
26	γ Pleiadum	5½	+79	+ 2	8 39.2	+ 5 21 33	+0.5281	.5541	+0.1170	-9.6068	.9612
26	δ Pleiadum	4½	+90	+12	8 41.3	+ 5 23 35	+0.7302	.5542	+0.1169	-9.6037	.9618
26	μ Pleiadum	7	+40	-28	8 47.8	+ 5 29 49	-0.0448	.5543	+0.1166	-9.6161	.9594
26	σ Tauri	5	+65	- 7	8 49.5	+ 3 31 28	+0.3571	.5543	+0.1166	-9.6097	.9607
26	1 Pleiadum	8	+90	+19	8 56.1	+ 5 37 54	+0.8300	.5544	+0.1163	-9.6023	.9621
26	2 Pleiadum	8½	+67	- 6	8 59.1	+ 5 40 46	+0.3780	.5544	+0.1162	-9.6097	.9607
26	3 Pleiadum	9	+90	+16	9 0.1	+ 5 41 46	+0.7868	.5544	+0.1161	-9.6032	.9620
26	4 Pleiadum	8	+78	+ 1	9 0.7	+ 5 42 20	+0.5178	.5544	+0.1161	-9.6076	.9611
26	5 Pleiadum	9	+55	-14	9 1.4	+ 5 42 58	+0.3073	.5544	+0.1161	-9.6125	.9601
26	6 Pleiadum	9	+83	+ 4	9 2.4	+ 5 43 57	+0.5711	.5544	+0.1161	-9.6068	.9612
26	c Pleiadum	5	+76	0	9 5.9	+ 5 47 17	+0.4981	.5545	+0.1159	-9.6081	.9610
26	7 Pleiadum	8	+90	+20	9 7.3	+ 5 48 38	+0.8470	.5545	+0.1158	-9.6024	.9621
26	k Pleiadum	7½	+61	-10	9 7.8	+ 5 49 8	+0.2963	.5545	+0.1158	-9.6113	.9603
26	l Pleiadum	7½	+64	- 8	9 11.5	+ 5 52 41	+0.3317	.5545	+0.1157	-9.6108	.9604
26	9 Pleiadum	8½	+90	+12	9 17.7	+ 5 58 40	+0.7044	.5546	+0.1154	-9.6051	.9616
26	d Pleiadum	5	+90	+28	9 19.6	+ 6 0 34	+0.9665	.5546	+0.1154	-9.6009	.9624
26	10 Pleiadum	8	+90	+ 8	9 22.5	+ 6 3 21	+0.6463	.5546	+0.1152	-9.6062	.9613
26	11 Pleiadum	8½	+90	+12	9 28.0	+ 6 8 40	+0.8160	.5547	+0.1150	-9.6036	.9618
26	12 Pleiadum	7½	+67	- 5	9 36.3	+ 6 16 38	+0.3850	.5547	+0.1148	-9.6107	.9604
26	13 Pleiadum	8½	+90	+27	9 39.0	+ 6 19 17	+0.9515	.5547	+0.1147	-9.6818	.9622
26	15 Pleiadum	8½	+90	+18	9 44.3	+ 6 24 21	+0.8187	.5547	+0.1145	-9.6641	.9618
26	16 Pleiadum	9½	+90	+42	9 44.8	+ 6 24 52	+1.1524	.5547	+0.1145	-9.5987	.9628
26	18 Pleiadum	8	+90	+18	9 45.5	+ 6 25 31	+0.8091	.5547	+0.1144	-9.6043	.9617
26	p Pleiadum	7½	+90	+19	9 46.2	+ 6 26 16	+0.8352	.5547	+0.1144	-9.6039	.9618
26	20 Pleiadum	8	+64	- 8	9 46.9	+ 6 26 53	+0.3310	.5547	+0.1144	-9.6119	.9602
26	22 Pleiadum	8	+90	+34	9 48.0	+ 6 27 54	+1.0508	.5547	+0.1144	-9.6004	.9625
26	21 Pleiadum	8½	+59	-12	9 48.0	+ 6 27 57	+0.8597	.5547	+0.1144	-9.6131	.9600
26	24 Pleiadum	8	+90	+ 9	9 49.7	+ 6 29 33	+0.6567	.5548	+0.1143	-9.6068	.9612
26	η Tauri	3½	+90	+20	9 49.8	+ 6 29 40	+0.8585	.5548	+0.1143	-9.6037	.9618
26	27 Pleiadum	8½	+90	+ 9	10 8.9	+ 6 48 9	+0.6599	.5550	+0.1136	-9.6074	.9611
26	29 Pleiadum	8	+90	+ 8	10 16.1	+ 6 55 8	+0.6430	.5552	+0.1138	-9.6079	.9610
26	s Pleiadum	7½	+90	+46	10 28.4	+ 7 6 54	+1.1863	.5553	+0.1129	-9.5993	.9627
26	f Pleiadum	4½	+90	+29	10 33.9	+ 7 12 13	+0.9872	.5553	+0.1127	-9.6028	.9620
26	h Pleiadum	5½	+90	+23	10 34.4	+ 7 12 41	+0.8993	.5553	+0.1127	-9.6043	.9617
26	30 Pleiadum	8½	+90	+44	10 35.1	+ 7 13 25	+1.1673	.5553	+0.1127	-9.5999	.9626
26	31 Pleiadum	8	+89	+ 7	10 36.5	+ 7 14 41	+0.6247	.5553	+0.1126	-9.6087	.9608



## ELEMENTS FOR FACILITATING THE CALCULATION OF ECLIPSATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\phi$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Mar. 26	32 Pleiadum	8	+90	+8	h. m.	h. m. s.	+0.8449	0.5554	+1.126	+9.6085	9.9609
	33 Pleiadum	8½	+90	+17	10 38.6	+ 7 16 49	+0.7911	.5554	+1.125	+9.6062	.9613
	35 Pleiadum	9	+90	+18	10 40.6	+ 7 18 44	+0.8108	.5555	+1.125	+9.6062	.9613
	36 Pleiadum	9	+90	+20	10 49.5	+ 7 27 17	+0.8462	.5555	+1.122	+9.6057	.9615
	37 Pleiadum	8	+90	+13	10 53.3	+ 7 30 57	+0.7058	.5555	+1.121	+9.6080	.9610
	38 Pleiadum	8	+90	+52	10 55.2	+ 7 32 48	+1.2431	.5555	+1.121	+9.5993	.9627
	B.A.C. 1192	6½	+10	-59	11 1.9	+ 7 39 15	-0.5968	.5558	+1.118	+9.6284	.9567
	39 Pleiadum	8	+82	+4	11 7.3	+ 7 44 29	+0.5555	.5556	+1.117	+9.6104	.9605
	40 Pleiadum	7½	+90	+43	11 18.8	+ 7 55 30	+1.1633	.5558	+1.114	+9.6014	.9623
	γ Tauri	5½	+84	+8	0 52.9	- 2 59 40	+0.5735	.5642	+0.787	+9.6308	.9562
	136 Tauri	5	0	-63	14 5.3	+ 8 48 27	-0.7440	.5782	-0.221	+9.6655	.9477
	139 Tauri	5½	+90	+33	16 1.2	+10 39 49	+0.9228	.5788	-0.278	+9.6408	.9539
	α Geminor.	8½	+88	+10	10 28.5	+ 4 24 7	+0.6079	.5792	-0.804	+9.6303	.9563
	α Geminor.	5	-22	-65	2 25.6	+ 4 15 42	-1.0688	.5768	-1.236	+9.6311	.9561
	α Cancri	5	+25	-48	20 38.0	-10 44 55	-0.3345	.5715	-1.686	+9.5733	.9672
	γ Cancri	6	-24	-69	7 2.7	- 0 43 37	-1.1218	.5677	-1.912	+9.5526	.9704
	35 Cancri	6½	+17	-59	8 9.6	+ 0 20 46	-0.4818	.5673	-1.939	+9.5354	.9728
	B.A.C. 2899	7	+23	-53	9 15.8	+ 1 24 35	-0.3794	.5670	-1.961	+9.5288	.9737
	B.A.C. 2906	7½	-7	-70	9 45.0	+ 1 52 40	-0.3910	.5668	-1.973	+9.5375	.9725
	38 Cancri	7	-18	-70	10 0.0	+ 2 7 8	-1.0445	.5668	-1.977	+9.5396	.9722
	B.A.C. 2914	7	-3	-70	10 3.6	+ 2 10 36	-0.8245	.5666	-1.978	+9.5347	.9729
	39 Cancri	6	-47	-70	10 9.8	+ 2 16 31	-1.3092	.5666	-1.980	+9.5443	.9716
	40 Cancri	6	-41	-70	10 12.0	+ 2 18 41	-1.2803	.5666	-1.981	+9.5436	.9717
	B.A.C. 2919	7	-14	-70	10 16.9	+ 2 23 23	-0.9922	.5666	-1.981	+9.5373	.9726
	α Cancri	6½	-6	-70	10 19.0	+ 2 25 22	-0.8730	.5666	-1.982	+9.5347	.9729
	42 Cancri	6½	-20	-70	10 25.6	+ 2 31 48	-1.0713	.5664	-1.989	+9.5383	.9724
	B.A.C. 2925	6	-11	-70	10 31.3	+ 2 37 17	-0.9506	.5661	-1.991	+9.5354	.9728
	B.A.C. 2931	7	-27	-70	10 53.6	+ 2 58 42	-1.1550	.5661	-1.996	+9.5382	.9724
	44 Cancri	7½	+60	-18	11 28.6	+ 3 32 27	+0.2923	.5660	-2.014	+9.5049	.9766
	δ Cancri	4	+51	-26	12 8.2	+ 4 10 33	+0.1423	.5660	-2.020	+9.5052	.9765
Apr. 1	18 Leonis	6	+63	-21	14 45.8	+ 5 50 26	+0.3420	.5564	-2.467	+9.3336	.9897
	B.A.C. 3345	6	+81	-8	15 16.8	+ 6 20 20	+0.5914	.5563	-2.472	+9.3204	.9903
	α Leonis	5	+28	-56	0 14.6	- 9 0 49	-0.2914	.5539	-2.581	+9.2679	.9924
	δ Leonis	5	+25	-62	23 44.2	-10 20 15	-0.3478	.5499	-2.758	+8.8713	9.9987
	ν Leonis	4½	+15	-75	16 3.7	+ 5 25 29	-0.5320	.5500	-2.789	-6.9882	0.0000
	γ Virginis	5	+82	+12	17 20.3	+ 5 49 29	+1.0118	.5541	-2.689	-9.1789	9.9950
	χ Virginis	5	-18	-90	19 45.0	+ 8 9 5	-1.0705	.5551	-2.667	-9.0998	.9965
	ψ Virginis	5	-37	-90	2 21.2	- 9 28 40	-1.2794	.5576	-2.610	-9.1838	.9949
	75 Virginis	5	+59	-23	18 56.2	+ 6 30 48	+0.3830	.5626	-2.376	-9.4029	.9857
	B.A.C. 4984	6	+67	+27	11 5.8	- 2 49 25	+1.1293	.5765	-1.580	-9.5998	.9626
	42 Libræ	5½	-11	-90	23 22.1	+ 8 58 36	-0.7071	.5794	-1.262	-9.5982	.9629
	b Scorpii	5	+65	+8	3 37.1	-10 56 12	+0.7894	.5797	-1.151	-9.6312	.9561
	α Scorpii	5	+37	-29	4 41.0	- 9 54 46	+0.2413	.5799	-1.122	-9.6244	.9576
	π Scorpii	3½	+65	+6	6 45.8	- 7 54 49	+0.8379	.5801	-1.066	-9.6373	.9548
	B.A.C. 5347	5	+64	-2	10 27.8	- 4 21 27	+0.7091	.5802	-0.962	-9.6411	.9538
	σ Scorpii	3½	-3	-74	15 42.9	+ 0 41 28	-0.4742	.5802	-0.817	-9.6301	.9564
	α Scorpii	1½	+90	-33	18 59.1	+ 3 50 2	+0.1676	.5797	-0.727	-9.6437	.9532
	23 Scorpii	5	-54	-90	19 30.3	+ 4 10 24	-1.2210	.5798	-0.720	-9.6227	.9580
	α Ophiuchi	5	-5	-70	18 30.5	- 2 21 27	-0.4095	.5762	-0.200	-9.6478	.9522
	43 Ophiuchi	6	+72	+44	16 41.3	+ 0 41 57	+1.2334	.5752	-0.113	-9.6716	.9459
	3 Sagittarii	5	+63	+20	2 37.0	+10 15 12	+1.0195	.5709	+0.160	-9.6684	.9469
	B.A.C. 6194	5½	+63	-1	15 23.2	- 1 26 59	+0.7209	.5638	+0.050	-9.6584	.9496
	1 Sagittarii	3	-19	-90	19 39.3	+ 2 39 43	-0.7473	.5616	+0.065	-9.6340	.9555
	σ Sagittarii	2½	+64	+35	7 27.1	- 9 57 44	+1.1776	.5536	+0.088	-9.6490	.9519
	ψ Sagittarii	5	+65	+19	16 29.9	- 1 13 49	+1.0283	0.5470	+1.091	-9.6338	9.9553



ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	$p'$	$q'$	Log sin $D$	Log cos $D$
Apr. 11	$\chi^1$ Sagittarii	5½	+66	+8	h. m. s.	h. m. s.	+0.8774	0.5445	+1.181	-9.6223	.9681
12	$\sigma$ Capricor.	5½	-48	-90	20 55.6	+ 3 2 47	-1.2691	.5252	+1.656	-9.5246	.9742
13	$\nu$ Capricor.	5½	+7	-75	8 52.8	-10 9 27	-0.5063	.5183	+1.810	-9.5044	.9767
13	19 Capricor.	6	+72	-5	16 22.2	-2 53 34	+0.6923	.5136	+1.914	-9.5003	.9771
13	$\theta$ Capricor.	4	+73	+20	22 7.4	+ 2 41 23	+1.0824	.5101	+1.984	-9.4649	.9787
14	$\lambda$ Capricor.	5½	0	-90	19 48.0	- 0 15 27	-0.7469	.4990	+2.209	-9.3182	.9904
15	$\theta$ Aquarii	4½	-5	-90	12 29.5	- 8 1 35	-0.8656	.4935	+2.333	-9.1683	.9952
15	$\epsilon$ Aquarii	5½	+21	-65	14 22.0	- 6 12 12	-0.3789	.4906	+2.346	-9.1708	.9952
17	$\pi$ Piscium	4½	-29	-90	4 2.3	+ 6 27 23	-1.2297	.4899	+2.420	+7.9823	0.0000
17	$\lambda$ Piscium	5	+60	-27	12 35.1	- 9 13 36	+0.8124	.4911	+2.477	+8.2461	.9999
17	22 Piscium	6	+68	-21	18 8.8	- 3 48 53	+0.4254	.4918	+2.478	+8.5750	.9997
22	$g$ Pleiadum	5½	+65	-7	14 18.7	-11 11 31	+0.8579	.5585	+1.165	+9.6068	.9613
22	$b$ Pleiadum	4½	+81	+3	14 20.8	-11 9 30	+0.5495	.5585	+1.164	+9.6036	.9618
22	$m$ Pleiadum	7	+31	-37	14 27.2	-11 3 17	-0.2133	.5586	+1.161	+9.6161	.9594
22	$s$ Tauri	5	+54	-16	14 28.9	-11 1 42	+0.1869	.5586	+1.160	+9.6097	.9607
22	1 Pleiadum	8	+90	+9	14 35.5	-10 55 19	+0.6599	.5586	+1.157	+9.6023	.9621
22	2 Pleiadum	8½	+55	-14	14 38.5	-10 52 28	+0.2079	.5586	+1.155	+9.6097	.9607
22	3 Pleiadum	9	+87	+7	14 39.5	-10 51 28	+0.6153	.5587	+1.155	+9.6032	.9620
22	4 Pleiadum	8	+64	-7	14 40.1	-10 50 55	+0.3475	.5589	+1.155	+9.6075	.9611
22	5 Pleiadum	9	+45	-23	14 40.7	-10 50 20	+0.0376	.5590	+1.155	+9.6124	.9601
22	6 Pleiadum	9	+68	-5	14 41.8	-10 49 19	+0.4004	.5590	+1.154	+9.6068	.9613
22	$c$ Pleiadum	5	+63	-9	14 45.2	-10 46 2	+0.3228	.5590	+1.152	+9.6081	.9610
22	7 Pleiadum	8	+90	+10	14 46.5	-10 44 41	+0.6756	.5590	+1.152	+9.6024	.9621
22	$k$ Pleiadum	7½	+50	-19	14 47.0	-10 44 14	+0.1260	.5590	+1.151	+9.6113	.9603
22	$l$ Pleiadum	7½	+51	-17	14 50.7	-10 40 89	+0.1612	.5590	+1.150	+9.6108	.9604
22	9 Pleiadum	8½	+79	+2	14 56.9	-10 34 45	+0.5326	.5590	+1.147	+9.6050	.9616
22	$d$ Pleiadum	5	+90	+17	14 58.8	-10 32 52	+0.7947	.5590	+1.147	+9.6009	.9624
22	10 Pleiadum	8	+74	-1	15 1.7	-10 30 6	+0.4722	.5590	+1.145	+9.6062	.9613
22	11 Pleiadum	8½	+90	+8	15 7.1	-10 24 51	+0.6439	.5590	+1.143	+9.6036	.9618
22	12 Pleiadum	7½	+56	-14	15 15.3	-10 17 0	+0.2137	.5591	+1.139	+9.6107	.9604
22	13 Pleiadum	8½	+90	+16	15 18.0	-10 14 20	+0.7780	.5591	+1.138	+9.6018	.9622
22	14 Pleiadum	9	+90	+32	15 20.6	-10 11 51	+1.0273	.5591	+1.137	+9.5978	.9629
22	15 Pleiadum	8½	+90	+9	15 23.2	-10 9 22	+0.6458	.5592	+1.136	+9.6040	.9618
22	16 Pleiadum	9½	+90	+29	15 23.7	-10 8 54	+0.9786	.5592	+1.135	+9.5987	.9628
22	17 Pleiadum	8	+90	+36	15 24.3	-10 8 19	+1.0772	.5593	+1.135	+9.5970	.9631
22	18 Pleiadum	8	+90	+8	15 24.4	-10 8 13	+0.6364	.5594	+1.135	+9.6042	.9617
22	$p$ Pleiadum	7½	+90	+9	15 25.1	-10 7 29	+0.6622	.5594	+1.135	+9.6039	.9618
22	19 Pleiadum	8	+90	+45	15 25.5	-10 7 4	+1.1744	.5595	+1.135	+9.5954	.9634
22	20 Pleiadum	8	+52	-17	15 25.8	-10 6 49	+0.1598	.5595	+1.135	+9.6119	.9602
22	22 Pleiadum	8	+90	+22	15 26.8	-10 5 50	+0.8772	.5595	+1.134	+9.6004	.9635
22	21 Pleiadum	8½	+48	-20	15 26.9	-10 5 49	+0.0886	.5596	+1.134	+9.6131	.9600
22	23 Pleiadum	8½	+90	+41	15 28.2	-10 4 29	+1.1347	.5596	+1.133	+9.5962	.9633
22	24 Pleiadum	8	+75	0	15 28.5	-10 4 11	+0.4848	.5596	+1.133	+9.6068	.9613
22	$\gamma$ Tauri	3½	+90	+11	15 28.6	-10 4 7	+0.6808	.5596	+1.133	+9.6036	.9618
22	25 Pleiadum	8½	+90	+49	15 32.5	-10 0 20	+1.2151	.5596	+1.132	+9.5949	.9635
22	26 Pleiadum	9	+90	+61	15 35.2	- 9 57 47	+1.2915	.5596	+1.131	+9.5939	.9637
22	27 Pleiadum	8½	+75	0	15 47.6	- 9 45 51	+0.4864	.5598	+1.128	+9.6073	.9611
22	29 Pleiadum	8	+74	-1	15 54.7	- 9 38 59	+0.4699	.5598	+1.127	+9.6079	.9610
22	$s$ Pleiadum	7½	+90	+31	16 6.9	- 9 27 14	+1.0120	.5598	+1.119	+9.5994	.9627
22	$f$ Pleiadum	4½	+90	+18	16 12.3	- 9 22 1	+0.8134	.5598	+1.118	+9.6029	.9620
22	$h$ Pleiadum	5½	+90	+13	16 12.8	- 9 21 33	+0.7256	.5598	+1.118	+9.6043	.9617
22	30 Pleiadum	8½	+90	+30	16 13.6	- 9 20 46	+0.9927	.5598	+1.116	+9.5998	.9626
22	31 Pleiadum	8	+72	-2	16 14.8	- 9 19 34	+0.4521	.5598	+1.115	+9.6087	.9608
22	32 Pleiadum	8	+74	-1	16 17.0	- 9 17 29	+0.4718	.5598	+1.114	+9.6085	.9609
22	33 Pleiadum	8½	+88	+7	16 19.0	- 9 15 32	+0.6164	0.5598	+1.113	+9.6062	.9613



## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Apr. 22	34 Pleiadum	7½	+90	+48	h. m. s.	h. m. s.					
	22 35 Pleiadum	9	+90	+8	16 27.3	— 9 7 39	+1.2023	.5601	+1.111	+9.5969	9.9631
	22 36 Pleiadum	9	+90	+10	16 27.7	— 9 7 7	+0.6359	.5601	+1.111	+9.6062	.9613
	22 37 Pleiadum	8	+79	+3	16 31.5	— 9 3 26	+0.6714	.5603	+1.110	+9.6057	.9615
	22 38 Pleiadum	8	+90	+35	16 32.1	— 9 2 53	+0.5316	.5603	+1.109	+9.6080	.9610
					16 33.5	— 9 1 35	+1.0666	.5604	+1.109	+9.5993	.9627
	22 B.A.C. 1192	6½	— 1	— 65	16 40.0	— 8 55 15	—0.7670	.5604	+1.107	+9.6284	.9567
	22 39 Pleiadum	8	+68	— 4	16 45.5	— 8 50 2	+0.3993	.5605	+1.106	+9.6104	.9605
	22 40 Pleiadum	7½	+90	+30	16 55.9	— 8 40 2	+0.9870	.5606	+1.103	+9.6014	.9623
	23 γ Tauri	5½	+67	— 1	6 23.5	+ 4 18 17	+0.3784	.5682	+0.773	+9.6308	.9562
	24 Venus		+90	+26	7 16.1	+ 4 14 45	+0.7681	.5338	+0.053	+9.6415	.9538
	24 136 Tauri	5	—17	— 3	19 28.9	— 8 0 38	—0.9824	.5781	—0.236	+9.6655	.9477
	25 α Geminor.	3½	+65	— 8	15 59.1	+11 42 8	+0.3545	.5778	—0.805	+9.6303	.9563
	26 Jupiter		+90	+43	10 23.2	+ 5 24 13	+1.1714	.5678	—1.278	+9.5848	.9653
	27 μ² Cancri	5	+9	— 64	2 40.8	— 2 54 39	—0.6085	.5658	—1.668	+9.5734	.9672
	27 δ Cancri	6	+90	+28	12 54.8	+ 6 56 55	+1.0723	.5614	—1.881	+9.5030	.9768
	27 B.A.C. 2854	6½	+52	— 24	12 55.9	+ 6 57 57	+0.1585	.5614	—1.882	+9.5226	.9745
	27 35 Cancri	6½	+1	— 67	14 29.1	+ 8 27 45	—0.7591	.5605	—1.915	+9.5354	.9728
	27 B.A.C. 2899	7	+7	— 69	15 37.1	+ 9 33 19	—0.6552	.5599	—1.937	+9.5288	.9737
	27 B.A.C. 2906	7½	—27	—70	15 57.0	+ 9 52 6	—1.1776	.5601	—1.944	+9.5375	.9725
	27 38 Cancri	7	—51	—70	16 22.4	+10 17 0	—1.3286	.5596	—1.951	+9.5396	.9722
	27 B.A.C. 2914	7	—23	—70	16 26.1	+10 20 34	—1.1056	.5595	—1.952	+9.5348	.9729
	27 B.A.C. 2919	7	—41	—70	16 39.7	+10 33 41	—1.2753	.5596	—1.956	+9.5378	.9726
	27 α Cancri	6½	—27	—70	16 41.8	+10 35 43	—1.1543	.5592	—1.957	+9.5347	.9729
	27 B.A.C. 2925	6½	—35	—70	16 54.5	+10 47 56	—1.2325	.5594	—1.960	+9.5355	.9728
	27 44 Cancri	7½	+44	—32	17 53.3	+11 44 38	+0.0250	.5578	—1.978	+9.5049	.9766
	27 δ Cancri	4	+36	—40	18 33.5	—11 36 38	—0.1247	.5587	—1.992	+9.5052	.9765
	28 π² Cancri	6	+56	—22	7 59.5	+ 1 20 52	+0.2426	.5531	—2051	+9.4274	.9839
	29 A Leonis	5	+15	—71	7 45.6	+ 0 17 52	—0.5344	.5448	—2525	+9.3678	.9924
	30 d Leonis	5	+14	—76	8 1.3	+ 0 15 17	—0.5502	.5411	—2695	+8.8813	.9987
	30 γ¹ Leonis	6	+58	—29	10 59.8	+ 2 37 16	+0.2691	.5412	—2706	+8.6801	9.9995
May 1	ν Leonis	4½	+6	—90	0 51.6	— 7 58 44	—0.7005	.5420	—2726	—6.9887	0.0000
	2 γ Virginis	5	—26	—90	5 16.1	— 4 31 45	—1.1690	.5492	—2613	—9.0998	9.9965
	2 ψ Virginis	5	—48	—90	12 0.5	+ 1 58 41	—1.3593	.5517	—2553	—9.1838	.9949
	5 42 Libræ	5½	—5	—84	9 26.3	— 3 9 3	—0.5895	.5832	—1.229	—9.5984	.9628
	5 b Scorpii	5	+65	+11	13 39.5	+ 0 54 18	+0.9139	.5837	—1.135	—9.6312	.9561
	5 A Scorpii	5	+44	—22	14 42.9	+ 1 55 14	+0.3692	.5840	—1.108	—9.6244	.9576
	5 B.A.C. 5255	6	+48	—19	14 56.9	+ 2 8 42	+0.4309	.5840	—1.103	—9.6258	.9573
	5 4 Scorpii	6	+64	+47	15 26.8	+ 2 37 21	+1.2578	.5841	—1.086	—9.6396	.9542
	5 π Scorpii	3½	+65	+15	16 46.6	+ 3 54 4	+0.9685	.5842	—1.051	—9.6372	.9548
	5 B.A.C. 5314	6	+54	—12	18 34.1	+ 5 37 23	+0.5440	.5847	—1.003	—9.6336	.9556
	5 B.A.C. 5347	5	+64	+7	20 26.5	+ 7 25 22	+0.8505	.5849	—0.947	—9.6411	.9538
	6 σ Scorpii	3½	+5	—63	1 38.2	—11 35 7	—0.3200	.5851	—0.803	—9.6301	.9564
	6 α Scorpii	1½	+38	—24	4 52.1	— 8 28 52	+0.3256	.5855	—0.713	—9.6437	.9532
	6 22 Scorpii	5	—39	—90	5 13.0	— 8 8 48	—1.0558	.5853	—0.705	—9.6228	.9580
	6 A Ophiuchi	5	+5	—56	23 7.8	+ 9 3 51	—0.2129	.5828	—0.190	—9.6478	.9522
	7 3 Sagittarii	5	+63	+45	12 1.2	— 2 32 38	+1.2283	.5779	+0.076	—9.6684	.9469
	8 B.A.C. 6194	6	+63	+15	0 33.6	+ 9 31 21	+0.9510	.5710	+0.0517	—9.6584	.9496
	8 1 Sagittarii	3	—6	—77	4 49.0	—10 22 34	—0.4987	.5684	+0.0624	—9.6340	.9555
	9 φ Sagittarii	5	+65	+54	1 13.1	+ 9 17 13	+1.2888	.5538	+1.108	—9.6338	.9555
	9 χ¹ Sagittarii	5½	+66	+18	5 34.2	—10 30 47	+1.0081	.5401	+1.184	—9.6223	.9581
	9 Mars		+67	—3	16 43.8	+ 0 18 13	+0.7190	.5152	+1.410	—9.5965	.9632
	10 σ Capricor.	5½	—21	—90	6 51.1	—10 4 17	—0.9629	.5298	+1.672	—9.5248	.9742
	10 π Capricor.	5	—47	—90	10 42.9	— 6 19 52	—1.2706	.5267	+1.733	—9.5052	.9765
	10 ν Capricor.	5½	+23	—54	16 58.9	+ 0 15 35	—0.1994	.5220	+1.824	—9.5043	.9767
	12 λ Capricor.	5½	+16	—69	3 29.9	+ 9 14 13	—0.4383	.5005	+2.209	—9.3182	9.9904



**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.							
			North- ern.	South- ern.		$H$	$Y$	$p'$	$q'$	Log sin $D$	Log cos $D$		
			$^{\circ}$	$^{\circ}$	h. m.	h. m. s.							
May 12	$\delta$ Aquarii	4 $\frac{1}{2}$	+11	-78	20 11.7	+ 1 28 17	-0.5667	0.4940	+0.3325	-0.1685	9.9952		
12	$\epsilon$ Aquarii	5 $\frac{1}{2}$	+37	-47	22 3.9	+ 3 17 29	-0.0823	.4933	+0.3336	-0.1707	9.9952		
14	$\pi$ Piscium	4 $\frac{1}{2}$	-10	-90	11 42.2	- 8 5 4	-0.9782	.4889	+0.2455	+0.7333	0.0000		
14	$\lambda$ Piscium	5	+77	-14	20 15.2	+ 0 14 16	+0.5467	.4898	+0.2455	+0.2469	9.9999		
17	$\eta$ Piscium	4	+18	-64	7 20.6	+ 9 40 15	-0.4672	.5156	+0.2465	+0.4022	.9857		
22	136 Tauri	5	-31	-63	1 37.5	- 0 4 38	-1.1324	.5855	-0.0256	+0.6655	.9477		
22	139 Tauri	5 $\frac{1}{2}$	+79	+10	3 31.4	+ 1 44 47	+0.5196	.5853	-0.0312	+0.6408	.9540		
22	$\sigma$ Geminor.	3 $\frac{3}{4}$	+52	-13	21 49.4	- 4 40 13	+0.1635	.5832	-0.0828	+0.6303	.9563		
23	JUPITER		+80	0	23 35.8	- 3 53 4	+0.5439	.5656	-0.1471	+0.5729	.9673		
24	$\mu^2$ Cancri	5	- 6	-68	8 11.1	+ 4 22 57	-0.8441	.5689	-0.1680	+0.5733	.9672		
24	$\delta$ Cancri	6	+90	+11	18 23.0	- 9 47 33	+0.8243	.5628	-0.1897	+0.5030	.9768		
24	B.A.C. 2854	6 $\frac{1}{2}$	+38	-37	18 24.1	- 9 46 32	-0.0889	.5628	-0.1898	+0.5225	.9745		
24	35 Cancri	6 $\frac{1}{2}$	-15	-70	19 57.1	- 8 16 52	-1.0072	.5620	-0.1924	+0.5354	.9728		
24	B.A.C. 2899	7	- 8	-71	21 5.3	- 7 11 6	-0.9044	.5613	-0.1945	+0.5288	.9737		
24	44 Cancri	7 $\frac{1}{2}$	+30	-46	23 20.9	- 5 0 22	-0.2262	.5602	-0.1986	+0.5049	.9766		
24	$\delta$ Cancri	4	+22	-64	0 1.3	- 4 21 27	-0.3772	.5599	-0.1999	+0.5052	.9765		
26	A Leonis	5	0	-80	13 27.8	+ 7 47 28	-0.8041	.5416	-0.2508	+0.2678	.9924		
27	$\delta$ Leonis	5	0	-86	14 7.8	+ 7 38 40	-0.8104	.5358	-0.2659	+0.8814	9.9987		
27	$\epsilon^2$ Leonis	5	+90	+30	20 23.3	-10 18 10	+1.2388	.5355	-0.2675	+0.8790	0.0000		
28	$\nu$ Leonis	4 $\frac{1}{2}$	- 8	-90	7 20.0	+ 0 17 10	-0.9436	.5353	-0.2680	-0.9851	0.0000		
29	$\eta$ Virginis	6	+79	- 3	9 56.1	+ 2 0 54	+0.7509	.5408	-0.2577	-0.1789	9.9950		
29	$\chi$ Virginis	5	-50	-90	12 27.9	+ 4 27 43	-1.3709	.5443	-0.2558	-0.0998	9.9965		
June 1	42 Libræ	5 $\frac{1}{2}$	- 6	-86	18 18.0	+ 7 30 30	-0.6020	.5794	-0.1223	-0.5984	.9628		
1	$\delta$ Scorpii	5	+65	+12	22 34.5	+11 37 9	+0.9217	.5809	-0.1106	-0.6312	.9561		
1	A Scorpii	5	+45	-22	23 38.6	-11 21 10	+0.3757	.5812	-0.1077	-0.6244	.9576		
2	$\pi$ Scorpii	3 $\frac{1}{2}$	+65	+16	1 43.8	- 9 20 52	+0.9833	.5817	-0.1023	-0.6372	.9548		
2	B.A.C. 5347	5	+64	+ 8	5 26.0	- 5 47 16	+0.8726	.5825	-0.0921	-0.6411	.9538		
2	$\sigma$ Scorpii	3 $\frac{1}{2}$	+ 6	-61	10 40.6	- 0 44 51	-0.2931	.5835	-0.0778	-0.6303	.9564		
2	$\alpha$ Scorpii	1 $\frac{1}{2}$	+40	-22	13 56.0	+ 2 22 57	+0.3631	.5838	-0.0689	-0.6437	.9532		
2	22 Scorpii	5	-37	-90	14 17.1	+ 2 43 13	-1.0242	.5839	-0.0681	-0.6228	.9580		
3	A Ophiuchi	5	+ 9	-51	8 17.0	- 3 58 58	-0.1384	.5843	-0.0172	-0.6479	.9522		
4	B.A.C. 6194	5 $\frac{1}{2}$	+63	+25	9 41.5	- 3 32 54	+1.0755	.5736	-0.0537	-0.6584	.9496		
4	$\lambda$ Sagittarii	3	+ 1	-67	13 51.6	+ 0 27 53	-0.3651	.5712	-0.0644	-0.6338	.9555		
5	B.A.C. 6576	6	+41	-26	10 13.9	- 3 54 10	+0.3054	.5573	-0.1132	-0.6163	.9593		
5	$\chi^1$ Sagittarii	5 $\frac{1}{2}$	+66	+36	14 30.5	+ 0 13 28	+1.2001	.5538	-0.1228	-0.6222	.9581		
5	$\chi^2$ Sagittarii	6 $\frac{1}{2}$	+66	+26	14 33.5	+ 0 16 20	+1.1059	.5538	-0.1228	-0.6208	.9584		
5	$\chi^3$ Sagittarii	6	+62	- 7	14 37.6	+ 0 20 17	+0.6304	.5537	-0.1229	-0.6133	.9599		
6	$\sigma$ Capricor.	5 $\frac{1}{2}$	- 7	-90	15 33.0	+ 0 25 33	-0.7874	.5279	-0.1678	-0.5246	.9742		
6	$\pi$ Capricor.	5	-26	-90	19 22.6	+ 4 7 42	-1.0459	.5307	+0.1758	-0.5052	.9765		
6	$\epsilon$ Capricor.	5	-65	-90	20 7.8	+ 4 51 29	-1.3412	.5302	+0.1766	-0.4962	.9775		
7	$\nu$ Capricor.	5 $\frac{1}{2}$	+35	-41	1 34.7	+10 8 8	+0.0277	.5259	+0.1852	-0.5043	.9767		
8	$\lambda$ Capricor.	5 $\frac{1}{2}$	+30	-53	11 52.5	- 4 35 23	-0.1784	.5029	+0.2222	-0.3181	.9904		
9	$\delta$ Aquarii	4 $\frac{1}{2}$	+25	-60	4 23.8	+11 28 9	-0.2982	.4942	+0.2329	-0.1685	.9952		
9	$\epsilon$ Aquarii	5 $\frac{1}{2}$	+51	-33	6 15.5	-10 43 9	+0.1874	.4938	+0.2359	-0.1708	9.9952		
10	$\pi$ Piscium	4 $\frac{1}{2}$	+ 5	-88	19 50.8	+ 1 51 22	-0.7181	.4879	+0.3444	+0.7345	0.0000		
11	$\lambda$ Piscium	5	+90	0	4 25.0	+10 11 48	+0.8013	.4885	+0.2441	+0.2475	9.9999		
13	$\eta$ Piscium	4	+27	-53	15 47.9	- 4 4 37	-0.2881	.5133	+0.2137	+0.4023	.9857		
13	101 Piscium	6	+90	+12	17 59.9	- 1 56 32	+0.9179	.5152	+0.2119	+0.3822	.9870		
15	$\sigma$ Arietis	4 $\frac{1}{2}$	+90	+23	9 55.7	-11 17 4	+0.9568	.5470	+0.1546	+0.5499	.9708		
16	$\gamma$ Pleiadum	5 $\frac{1}{2}$	+66	- 6	5 50.5	+ 7 55 40	+0.3710	.5640	+0.1132	+0.6068	.9612		
16	$\delta$ Pleiadum	4 $\frac{1}{2}$	+82	+ 4	5 52.8	+ 7 57 54	+0.5608	.5640	+0.1131	+0.6087	.9618		
16	$\mu$ Pleiadum	7	+32	-35	5 58.8	+ 8 3 45	-0.1952	.5640	+0.1131	+0.6161	.9594		
16	$\sigma$ Tauri	5	+55	-14	6 0.5	+ 8 5 20	+0.2012	.5641	+0.1129	+0.6097	.9607		
16	1 Pleiadum	8	+90	+10	6 6.9	+ 8 11 31	+0.6686	.5641	+0.1127	+0.6023	.9621		
16	2 Pleiadum	8 $\frac{1}{2}$	+56	-13	6 9.9	+ 8 14 21	+0.2210	0.5641	+0.1126	+0.6097	9.9607		



## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallel.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		<i>H</i>	<i>Y</i>	<i>p'</i>	<i>q'</i>	Log sin <i>D</i>	Log cos <i>D</i>
June 16	3 Pleiadum	9	+88	+ 8	6 10.1	+ 8 14 30	+0.6230	.5641	+.1126	+9.6032	.9620
16	4 Pleiadum	8	+65	- 6	6 11.5	+ 8 15 53	+0.3589	.5641	+.1125	+9.6074	.9611
16	5 Pleiadum	9	+46	-22	6 12.1	+ 8 16 28	+0.0522	.5641	+.1125	+9.6125	.9601
16	6 Pleiadum	9	+69	- 4	6 13.1	+ 8 17 27	+0.4111	.5641	+.1124	+9.6068	.9612
16	c Pleiadum	5	+63	- 8	6 16.4	+ 8 20 39	+0.2339	.5643	+.1123	+9.6081	.9610
16	7 Pleiadum	7	+90	+11	6 18.0	+ 8 22 12	+0.6836	.5642	+.1122	+9.6025	.9621
16	k Pleiadum	7½	+51	-18	6 18.3	+ 8 22 27	+0.1395	.5642	+.1122	+9.6113	.9603
16	l Pleiadum	7½	+52	-16	6 21.8	+ 8 25 54	+0.1740	.5643	+.1120	+9.6108	.9604
16	9 Pleiadum	8½	+80	+ 3	6 28.9	+ 8 31 48	+0.5417	.5644	+.1118	+9.6050	.9616
16	d Pleiadum	5	+99	+18	6 29.8	+ 8 33 34	+0.8004	.5645	+.1117	+9.6009	.9624
16	10 Pleiadum	8	+74	0	6 32.8	+ 8 36 17	+0.4810	.5646	+.1116	+9.6062	.9613
16	11 Pleiadum	8½	+90	+ 9	6 37.9	+ 8 41 24	+0.6501	.5647	+.1113	+9.6036	.9618
16	12 Pleiadum	7½	+56	-13	6 43.9	+ 8 49 6	+0.2242	.5648	+.1110	+9.6107	.9604
16	13 Pleiadum	8½	+90	+17	6 48.6	+ 8 51 43	+0.7830	.5649	+.1109	+9.6018	.9622
16	14 Pleiadum	9	+90	+83	6 51.1	+ 8 54 8	+1.0301	.5649	+.1109	+9.5978	.9629
16	15 Pleiadum	8½	+90	+ 9	6 53.7	+ 8 56 37	+0.6519	.5649	+.1108	+9.6041	.9618
16	16 Pleiadum	9½	+90	+29	6 54.2	+ 8 57 4	+0.9813	.5650	+.1107	+9.5987	.9628
16	17 Pleiadum	8	+90	+37	6 54.8	+ 8 57 38	+1.0789	.5650	+.1107	+9.5970	.9631
16	18 Pleiadum	8	+90	+ 9	6 54.9	+ 8 57 44	+0.6425	.5650	+.1107	+9.6043	.9617
16	p Pleiadum	7½	+90	+10	6 55.6	+ 8 58 27	+0.6689	.5650	+.1106	+9.6039	.9618
16	19 Pleiadum	8	+90	+45	6 56.0	+ 8 58 50	+1.1752	.5650	+.1106	+9.5954	.9634
16	20 Pleiadum	8	+53	-15	6 56.2	+ 8 59 4	+0.1703	.5650	+.1106	+9.6119	.9602
16	22 Pleiadum	8	+90	+23	6 57.3	+ 9 0 3	+0.8810	.5650	+.1106	+9.6004	.9625
16	21 Pleiadum	8½	+49	-19	6 57.4	+ 9 0 8	+0.1001	.5650	+.1106	+9.6131	.9600
16	23 Pleiadum	8½	+90	+41	6 58.6	+ 9 1 23	+1.1358	.5651	+.1105	+9.5962	.9633
16	24 Pleiadum	8	+75	+ 1	6 59.0	+ 9 1 40	+0.4918	.5651	+.1105	+9.6068	.9612
16	γ Tauri	3½	+90	+11	6 59.0	+ 9 1 45	+0.6858	.5651	+.1105	+9.6036	.9618
16	25 Pleiadum	8½	+90	+49	7 2.9	+ 9 5 26	+1.2148	.5651	+.1103	+9.5950	.9635
16	27 Pleiadum	8½	+75	+ 1	7 17.6	+ 9 19 36	+0.4918	.5655	+.1096	+9.6073	.9611
16	29 Pleiadum	8	+74	0	7 24.6	+ 9 26 21	+0.4755	.5656	+.1092	+9.6079	.9610
16	s Pleiadum	7½	+90	+32	7 36.5	+ 9 37 51	+1.0109	.5658	+.1090	+9.5993	.9627
16	f Pleiadum	4½	+90	+19	7 41.8	+ 9 42 57	+0.8136	.5658	+.1088	+9.6028	.9620
16	h Pleiadum	5½	+90	+14	7 42.3	+ 9 43 25	+0.7268	.5658	+.1088	+9.6043	.9617
16	30 Pleiadum	8½	+90	+30	7 43.1	+ 9 44 10	+0.9908	.5659	+.1088	+9.5999	.9626
16	31 Pleiadum	8	+73	- 1	7 44.3	+ 9 45 24	+0.4560	.5659	+.1087	+9.6087	.9608
16	32 Pleiadum	8	+74	0	7 46.4	+ 9 47 24	+0.4752	.5659	+.1086	+9.6085	.9609
16	33 Pleiadum	8½	+88	+ 8	7 48.4	+ 9 49 20	+0.6193	.5659	+.1085	+9.6062	.9613
16	34 Pleiadum	7½	+90	+48	7 56.6	+ 9 57 11	+1.1984	.5659	+.1082	+9.5969	.9631
16	35 Pleiadum	9	+90	+ 9	7 57.9	+ 9 57 34	+0.6380	.5660	+.1082	+9.6062	.9613
16	36 Pleiadum	9	+90	+11	8 0.3	+10 0 45	+0.6728	.5660	+.1080	+9.6057	.9615
16	37 Pleiadum	8	+79	+ 3	8 1.2	+10 1 41	+0.5340	.5660	+.1080	+9.6079	.9610
16	38 Pleiadum	8	+90	+36	8 2.6	+10 2 57	+1.0641	.5660	+.1080	+9.5993	.9627
16	B.A.C. 1192	6½	0	-65	8 9.0	+10 9 10	-0.7525	.5660	+.1077	+9.6284	.9567
16	39 Pleiadum	8	+68	- 4	8 14.3	+10 14 18	+0.4020	.5661	+.1074	+9.6104	.9605
16	40 Pleiadum	7½	+90	+30	8 25.4	+10 24 55	+0.9828	.5662	+.1070	+9.6013	.9623
16	χ Tauri	5½	+63	- 4	21 34.0	- 0 59 43	+0.3266	.5775	+.0746	+9.6307	.9563
20	μ <sup>3</sup> Cancri	5	-13	-68	15 0.6	-11 0 1	-0.9561	.5762	-.1720	+9.5733	.9672
20	JUPITER		+37	-36	15 54.1	-10 8 31	-0.1026	.5667	-.1722	+9.5541	.9702
21	δ Cancri	6	+90	+ 3	0 59.1	- 1 23 59	+0.6806	.5701	-.1930	+9.5030	.9768
21	B.A.C. 2854	6½	+30	-44	1 0.1	- 1 23 0	-0.2232	.5701	-.1930	+9.5225	.9745
21	VENUS		+20	-56	1 56.7	- 0 28 26	-0.4216	.5672	-.1868	+9.5228	.9746
21	35 Cancri	6½	-25	-70	2 30.6	+ 0 4 11	-1.1347	.5690	-.1962	+9.5354	.9746
21	B.A.C. 2899	7	-17	-70	3 37.4	+ 1 8 32	-1.0344	.5682	-.1983	+9.5288	.9746
21	44 Cancri	7½	+23	-54	5 57.3	+ 3 16 56	-0.3659	.5669	-.2024	+9.5039	.9746
21	δ Cancri	4	+15	-62	6 30.1	+ 3 54 52	-0.5162	.5669	-.2038	+9.5032	.9746



**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	P'	q'	Log sin D	Log cos D
					h. m.	h. m. s.					
June 22	A Leonis	5	-11	-80	19 16.2	- 8 36 46	-0.9792	0.5462	-2532	+9.2678	9.9924
23	d Leonis	5	-12	-86	19 41.0	- 9 0 51	-1.0000	.5375	-2669	+8.8814	9.9987
24	e <sup>1</sup> Leonis	5	+90	+15	1 54.4	- 2 59 42	+1.0438	.5365	-2681	+8.0793	0.0000
24	v Leonis	4½	-21	-90	12 49.5	+ 7 34 4	-1.1358	.5355	-2679	-6.9816	0.0000
27	89 Virginis	5½	+73	+87	2 10.5	- 5 7 24	+1.2615	.5511	-2160	-9.4767	9.9796
28	B.A.C. 4984	6	+67	+24	12 35.5	+ 4 3 49	+1.0988	.5675	-1491	-9.5998	.9626
29	42 Libræ	5½	-11	-90	1 14.5	- 7 45 22	-0.6905	.5727	-1193	-9.5984	.9628
29	b Scorpii	5	+65	+ 7	5 36.0	- 3 33 42	+0.8531	.5744	-1080	-9.6312	.9561
29	A Scorpii	5	+40	-26	6 41.5	- 2 30 44	+0.3037	.5746	-1052	-9.6244	.9576
29	π Scorpii	3½	+65	+12	8 49.0	- 0 27 59	+0.9202	.5753	-0.998	-9.6373	.9548
29	B.A.C. 5314	6	+51	-15	10 39.8	+ 1 18 34	+0.4953	.5758	-0.946	-9.6336	.9556
29	B.A.C. 5347	5	+64	+ 5	12 35.6	+ 3 9 58	+0.8130	.5761	-0.894	-9.6411	.9538
29	σ Scorpii	3½	+ 3	-65	17 56.2	+ 8 18 22	-0.2546	.5876	-0.771	-9.6301	.9564
29	α Scorpii	1½	+37	-25	21 15.2	+11 29 48	+0.3119	.5882	-0.682	-9.6438	.9582
29	22 Scorpii	5	-42	-90	21 36.6	+11 50 25	-1.0867	.5883	-0.668	-9.6228	.9590
30	A Ophiuchi	5	+ 7	-53	15 54.8	+ 5 26 29	-0.1668	.5784	-0.152	-9.6479	.9522
July 1	B.A.C. 6194	5½	+63	+27	17 38.5	+ 6 11 53	+1.0919	.5710	+0.547	-9.6584	.9495
1	λ Sagittarii	3	+ 2	-65	21 51.2	+10 14 14	-0.3523	.5690	+0.655	-9.6339	.9555
2	γ <sup>1</sup> Sagittarii	5½	+65	+44	22 39.3	+10 10 2	+1.2514	.5535	+1.940	-9.6223	.9581
3	B.A.C. 6889	6	+60	-14	16 51.5	+ 3 45 12	+0.5310	.5403	+1.593	-9.5680	.9681
3	σ Capricor.	5½	- 3	-90	23 43.9	+10 24 12	-0.6671	.5348	+1.710	-9.5246	.9742
4	π Capricor.	5	-20	-90	8 33.1	- 9 53 57	-0.9640	.5320	+1.770	-9.5052	.9765
4	ε Capricor.	5	-45	-90	4 18.3	- 9 10 15	-1.2581	.5319	+1.780	-9.4962	.9775
4	v Capricor.	5½	+34	-43	9 54.0	- 3 45 6	+0.0028	.5273	+1.864	-9.5018	.9770
4	B.A.C. 7202	6	+72	+14	13 51.9	+ 0 5 25	+0.9886	.5246	+1.920	-9.5062	.9764
5	λ Capricor.	5½	+36	-46	19 55.8	+ 5 11 46	-0.0547	.5052	+2.289	-9.3181	.9904
6	δ Aquarii	4½	+32	-52	12 23.1	- 2 44 45	-0.1643	.4971	+2.347	-9.1684	.9952
6	ε Aquarii	5½	+59	-26	14 14.5	- 0 56 24	+0.3203	.4965	+2.357	-9.1706	.9952
7	η Aquarii	5	-37	-90	0 1.8	+ 8 34 48	-1.2972	.4929	+2.400	-9.9355	9.9984
8	π Piscium	4½	+13	-78	3 47.0	+11 35 16	-0.5696	.4882	+2.446	+7.9360	0.0000
8	λ Piscium	5	+90	+ 9	12 22.2	- 4 3 15	+0.9532	.4884	+2.441	+8.2482	9.9999
8	22 Piscium	6	+90	+15	17 58.2	+ 1 23 49	+1.0517	.4887	+2.431	+8.5758	.9997
9	45 Piscium	6	+61	-24	12 52.5	- 4 12 28	+0.3286	.4926	+2.370	+9.0810	.9968
11	η Piscium	4	+34	-46	0 12.9	+ 6 8 15	-0.1592	.5093	+2.119	+9.4023	.9857
11	B.A.C. 632	6	+39	-38	16 31.3	- 2 2 46	-0.0739	.5208	+1.932	+9.4801	.9792
12	ε Arietis	4½	+90	+30	18 54.5	- 0 30 27	+1.0588	.5424	+1.526	+9.5500	.9708
13	γ Pleiadum	5½	+73	- 2	15 3.8	- 5 3 1	+0.4511	.5595	+1.116	+9.6068	.9612
13	δ Pleiadum	4½	+90	+ 9	15 5.9	- 5 0 59	+0.6418	.5597	+1.115	+9.6037	.9618
13	η Pleiadum	7	+36	-31	15 12.3	- 4 54 50	-0.1173	.5598	+1.114	+9.6161	.9594
13	ε Tauri	5	+60	-10	15 14.0	- 4 53 15	+0.2808	.5597	+1.113	+9.6097	.9607
13	1 Pleiadum	8	+90	+15	15 20.5	- 4 46 59	+0.7497	.5598	+1.110	+9.6022	.9621
13	2 Pleiadum	8½	+61	- 9	15 23.4	- 4 44 8	+0.3007	.5598	+1.109	+9.6097	.9607
13	3 Pleiadum	9	+90	+12	15 24.5	- 4 43 7	+0.7057	.5598	+1.109	+9.6032	.9620
13	4 Pleiadum	8	+71	- 2	15 25.0	- 4 42 35	+0.4391	.5599	+1.108	+9.6076	.9611
13	5 Pleiadum	9	+50	-18	15 25.2	- 4 42 25	+0.1304	.5599	+1.108	+9.6124	.9601
13	6 Pleiadum	9	+75	+ 1	15 26.7	- 4 41 0	+0.4918	.5599	+1.108	+9.6068	.9612
13	c Pleiadum	5	+70	- 3	15 30.1	- 4 37 45	+0.6146	.5599	+1.106	+9.6080	.9610
13	7 Pleiadum	8	+90	+16	15 31.4	- 4 36 25	+0.7649	.5599	+1.106	+9.6024	.9621
13	k Pleiadum	7½	+56	-13	15 31.9	- 4 35 57	+0.2191	.5600	+1.105	+9.6113	.9603
13	l Pleiadum	7½	+58	-12	15 35.6	- 4 32 26	+0.2537	.5600	+1.103	+9.6108	.9604
13	9 Pleiadum	8½	+88	+ 8	15 41.7	- 4 26 31	+0.8224	.5601	+1.102	+9.6050	.9616
13	d Pleiadum	5	+90	+22	15 43.6	- 4 24 41	+0.8822	.5601	+1.101	+9.6008	.9624
13	10 Pleiadum	8	+81	+ 4	15 46.4	- 4 21 57	+0.5529	.5602	+1.100	+9.6062	.9613
13	11 Pleiadum	8½	+90	+14	15 51.8	- 4 16 45	+0.7318	.5603	+1.098	+9.6036	.9618
13	12 Pleiadum	7½	+61	- 9	15 59.9	- 4 8 58	+0.3035	0.5603	+1.094	+9.6107	9.9604



## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.						
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D	
					h. m. s.	h. m. s.						
July 13	13 Pleiadum	8½	+90	+22	16 2.6	— 4 6 19	+0.8646	.5604	+1.093	+9.6017	.9692	
13	14 Pleiadum	9	+90	+39	16 5.2	— 4 3 53	+1.1120	.5603	+1.094	+9.5978	.9629	
13	15 Pleiadum	8½	+90	+14	16 8.1	— 4 1 1	+0.7330	.5603	+1.093	+9.6040	.9618	
13	16 Pleiadum	9½	+90	+35	16 8.6	— 4 0 32	+1.0637	.5603	+1.093	+9.5987	.9628	
13	17 Pleiadum	8	+90	+44	16 9.2	— 3 59 59	+1.1614	.5604	+1.092	+9.5971	.9631	
13	18 Pleiadum	8	+90	+13	16 9.3	— 3 59 51	+0.7236	.5604	+1.092	+9.6043	.9617	
13	p Pleiadum	7½	+90	+15	16 10.1	— 3 59 8	+0.7489	.5604	+1.092	+9.6039	.9618	
13	20 Pleiadum	8	+58	—12	16 10.8	— 3 58 28	+0.2497	.5604	+1.092	+9.6119	.9602	
13	22 Pleiadum	8	+90	+23	16 11.8	— 3 57 26	+0.9627	.5604	+1.091	+9.6004	.9625	
13	21 Pleiadum	8½	+53	—15	16 11.8	— 3 57 26	+0.1787	.5604	+1.091	+9.6131	.9600	
13	24 Pleiadum	8	+83	+ 5	16 13.6	— 3 55 46	+0.5723	.5604	+1.091	+9.6069	.9612	
13	7 Tauri	3½	+90	+16	16 13.6	— 3 55 41	+0.7670	.5604	+1.091	+9.6037	.9618	
13	27 Pleiadum	8½	+83	+ 5	16 31.4	— 3 38 35	+0.5707	.5607	+1.084	+9.6073	.9611	
13	29 Pleiadum	8	+81	+ 4	16 38.7	— 3 31 36	+0.5546	.5608	+1.081	+9.6079	.9610	
13	s Pleiadum	7½	+90	+38	16 51.0	— 3 19 43	+1.0914	.5610	+1.075	+9.5993	.9627	
13	f Pleiadum	4½	+90	+24	16 56.5	— 3 14 24	+0.8939	.5611	+1.073	+9.6027	.9620	
13	A Pleiadum	5½	+90	+18	16 56.9	— 3 14 1	+0.8067	.5611	+1.073	+9.6043	.9617	
13	30 Pleiadum	8½	+90	+36	16 57.6	— 3 13 19	+1.0718	.5611	+1.073	+9.5997	.9626	
13	31 Pleiadum	8	+79	+ 3	16 58.9	— 3 12 4	+0.5346	.5611	+1.072	+9.6087	.9608	
13	32 Pleiadum	8	+81	+ 4	17 1.1	— 3 10 0	+0.5540	.5611	+1.071	+9.6085	.9609	
13	33 Pleiadum	8½	+90	+12	17 3.1	— 3 8 4	+0.6985	.5612	+1.070	+9.6062	.9613	
13	35 Pleiadum	9	+90	+13	17 11.7	— 2 59 45	+0.7189	.5613	+1.067	+9.6062	.9613	
13	36 Pleiadum	9	+90	+15	17 15.4	— 2 56 9	+0.7516	.5613	+1.065	+9.6057	.9615	
13	37 Pleiadum	8	+87	+ 8	17 16.0	— 2 55 37	+0.6128	.5613	+1.065	+9.6080	.9610	
13	38 Pleiadum	8	+90	+43	17 17.3	— 2 54 20	+1.1445	.5613	+1.064	+9.5993	.9627	
13	B.A.C. 1192	6½	+ 4	—63	17 23.8	— 2 48 4	—0.6784	.5614	+1.061	+9.6284	.9567	
13	39 Pleiadum	8	+75	+ 1	17 29.4	— 2 42 42	+0.4799	.5615	+1.059	+9.6104	.9605	
13	40 Pleiadum	7½	+90	+36	17 40.4	— 2 32 4	+1.0632	.5616	+1.054	+9.6014	.9623	
14	2 Tauri	5½	+68	— 1	6 56.4	+10 14 36	+0.3905	.5722	+0.733	+9.6308	.9562	
15	136 Tauri	5	—30	—63	19 3.7	— 3 2 39	—1.1228	.5906	—0.283	+9.6655	.9477	
15	139 Tauri	5½	+79	+ 9	20 55.4	— 1 15 28	+0.5071	.5909	—0.339	+9.6408	.9539	
16	1 Geminor.	3½	+42	—22	14 52.9	— 8 1 27	—0.0031	.5920	—0.069	+9.6319	.9560	
20	A Leonis	5	—13	—80	2 51.2	+ 0 45 56	+1.0200	.5546	—2.576	+9.2678	.9924	
20	43 Leonis	6	+84	— 8	9 36.2	+ 7 16 50	+0.6288	.5516	—2.632	+9.1011	.9965	
21	d Leonis	5	—15	—86	2 34.9	— 0 19 17	—1.0522	.5458	—2.713	+8.8815	.99987	
21	g <sup>h</sup> Leonis	5	+90	+ 9	8 38.3	+ 5 31 50	+0.9636	.5444	—2.724	+8.0795	0.0000	
21	v Leonis	4½	—26	—90	19 16.8	— 8 11 6	—1.1921	.5424	—2.716	—6.9778	0.0000	
23	69 Virginis	5½	+75	+27	21 42.8	— 7 27 5	+1.1803	.5484	—2.307	+9.4201	.99844	
24	89 Virginis	5½	+73	+29	7 39.6	+ 2 9 4	+1.1904	.5519	—2.157	+9.4767	.9796	
26	42 Libræ	5½	—14	—90	6 49.3	— 0 23 13	—0.7418	.5690	—1.180	—9.5984	.9628	
26	b Scorpii	5	+65	+ 4	11 13.2	+ 3 50 50	+0.8110	.5703	—1.073	+9.6312	.9561	
26	A Scorpii	5	+38	—28	12 19.2	+ 4 54 26	+0.2574	.5706	—1.046	+9.6244	.9576	
26	4 Scorpii	6	+64	+33	13 4.9	+ 5 38 25	+1.1655	.5708	—1.025	+9.6396	.9542	
26	π Scorpii	3½	+65	+ 9	14 28.1	+ 6 58 30	+0.8770	.5711	—0.892	+9.6372	.9548	
26	B.A.C. 5347	5	+64	+ 2	18 17.1	+10 38 54	+0.7718	.5719	—0.891	+9.6411	.9538	
26	α Scorpii	3½	+ 1	—68	23 41.5	— 8 8 57	—0.3984	.5729	—0.746	+9.6301	.9564	
27	σ Scorpii	1½	+35	—27	3 2.9	+ 4 55 4	+0.2724	.5733	—0.658	+9.6437	.9532	
27	22 Scorpii	5	—45	—90	3 24.6	+ 4 34 11	—1.1324	.5733	—0.659	+9.6228	.9580	
27	A Ophiuchi	5	+ 5	—55	21 57.8	—10 43 3	—0.2009	.5733	—0.147	+9.6478	.9522	
29	B.A.C. 6194	5½	+63	+25	0 4.3	+ 9 34 46	+1.0737	.5664	+0.545	+9.6584	.9496	
29	1 Sagittarii	3	+ 1	—67	4 20.4	— 5 28 2	—0.3765	.5644	+0.061	+9.6339	.9555	
30	γ <sup>1</sup> Sagittarii	5½	+65	+42	5 27.6	— 5 13 21	+1.2442	.5503	+1.236	+9.6222	.9555	
31	σ Capricor.	5½	— 4	—90	6 46.3	+ 4 45 46	—0.6751	.5332	+1.170	+9.5246	.9555	
31	π Capricor.	5	—21	—90	10 37.2	— 1 2 19	—0.9723	.5305	+1.168	+9.5052	.9555	
31	ε Capricor.	5	—46	—90	11 22.6	— 0 18 19	—1.2677	.5289	+1.178	+9.4963	.9555	



**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of δ.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	P'	q'	Log sin D	Log cos D
Aug. 2	λ Capricor.	5½	+36	—46	h. m. s.	— 9 44 13	—0.0577	0.5058	+0.2242	—9.3180	9.9904
	δ Aquarii	4½	+39	—51	19 36.1	+ 8 15 49	—0.1601	.5037	+0.2353	—9.1683	.9952
	ϩ Aquarii	5½	+59	—26	21 27.3	+ 8 3 56	+0.3249	.4975	+0.2363	—9.1705	.9952
	π Aquarii	5	—37	—90	7 14.1	— 6 24 19	—1.2957	.4943	+0.2405	—8.9352	9.9984
4	π Piscium	4½	+13	—78	10 57.9	— 3 26 8	—0.5679	.4890	+0.2451	+7.9372	0.0000
4	λ Piscium	5	+90	+ 9	19 33.4	+ 4 55 33	+0.9576	.4892	+0.2445	+8.2488	9.9999
7	η Piscium	4	+34	—46	7 44.7	— 8 32 17	—0.1678	.5068	+0.2105	+9.4023	.9857
9	ε Arietis	4½	+90	+30	3 8.5	+ 9 31 22	+1.0549	.5363	+0.1509	+9.5500	.9708
9	ϩ Pleiadum	5½	+71	— 2	23 44.1	+ 5 25 8	+0.4400	.5526	+0.1099	+9.6068	.9612
9	δ Pleiadum	4½	+89	+ 8	23 45.8	+ 5 26 46	+0.6317	.5526	+0.1098	+9.6037	.9618
9	π Pleiadum	7	+35	—33	23 52.8	+ 5 33 29	—0.1332	.5527	+0.1097	+9.6161	.9594
9	α Tauri	5	+59	—11	23 54.5	+ 5 35 9	+0.2680	.5527	+0.1096	+9.6097	.9607
10	1 Pleiadum	8	+90	+14	0 0.7	+ 5 41 9	+0.7408	.5527	+0.1094	+9.6024	.9621
10	2 Pleiadum	8½	+60	—10	0 4.2	+ 5 44 28	+0.2882	.5527	+0.1092	+9.6097	.9607
10	3 Pleiadum	9	+90	+12	0 5.2	+ 5 45 29	+0.6971	.5528	+0.1092	+9.6082	.9620
10	4 Pleiadum	8	+70	— 3	0 5.8	+ 5 46 4	+0.4282	.5528	+0.1092	+9.6075	.9611
10	5 Pleiadum	9	+50	—19	0 6.4	+ 5 46 39	+0.1171	.5529	+0.1091	+9.6126	.9601
10	6 Pleiadum	9	+75	0	0 7.5	+ 5 47 40	+0.4809	.5529	+0.1091	+9.6068	.9612
10	c Pleiadum	5	+68	— 3	0 10.9	+ 5 51 0	+0.4024	.5530	+0.1089	+9.6081	.9610
10	7 Pleiadum	8	+90	+15	0 12.4	+ 5 52 24	+0.7567	.5530	+0.1089	+9.6024	.9621
10	ε Pleiadum	7½	+55	—14	0 12.8	+ 5 52 51	+0.2055	.5531	+0.1088	+9.6113	.9603
10	ι Pleiadum	7½	+56	—12	0 16.8	+ 5 56 39	+0.2403	.5531	+0.1087	+9.6108	.9604
10	9 Pleiadum	8½	+87	+ 7	0 22.8	+ 6 2 27	+0.6128	.5531	+0.1085	+9.6051	.9616
10	δ Pleiadum	5	+90	+22	0 24.8	+ 6 4 20	+0.8746	.5531	+0.1084	+9.6009	.9624
10	10 Pleiadum	8	+81	+ 4	0 27.7	+ 6 7 9	+0.5513	.5532	+0.1083	+9.6062	.9613
10	11 Pleiadum	8½	+90	+13	0 33.2	+ 6 12 29	+0.7233	.5532	+0.1081	+9.6036	.9618
10	12 Pleiadum	7½	+61	—10	0 41.5	+ 6 20 25	+0.2912	.5535	+0.1078	+9.6107	.9604
10	13 Pleiadum	8½	+90	+21	0 44.3	+ 6 23 9	+0.8576	.5535	+0.1077	+9.6017	.9622
10	14 Pleiadum	9	+90	+39	0 46.9	+ 6 25 40	+1.1076	.5535	+0.1076	+9.5978	.9629
10	15 Pleiadum	8½	+90	+13	0 49.5	+ 6 28 10	+0.7244	.5535	+0.1076	+9.6040	.9618
10	16 Pleiadum	9½	+90	+35	0 50.0	+ 6 28 40	+1.0578	.5535	+0.1075	+9.5987	.9628
10	17 Pleiadum	8	+90	+43	0 50.6	+ 6 29 16	+1.1566	.5536	+0.1075	+9.5971	.9631
10	18 Pleiadum	8	+90	+13	0 50.7	+ 6 29 22	+0.7145	.5536	+0.1075	+9.6043	.9617
10	p Pleiadum	7½	+90	+14	0 51.5	+ 6 30 7	+0.7401	.5536	+0.1075	+9.6039	.9618
10	19 Pleiadum	8	+90	+54	0 51.9	+ 6 30 30	+1.2540	.5536	+0.1074	+9.5954	.9634
10	20 Pleiadum	8	+57	—12	0 52.1	+ 6 30 46	+0.2359	.5536	+0.1074	+9.6119	.9602
10	22 Pleiadum	8	+90	+28	0 53.2	+ 6 31 46	+0.9559	.5536	+0.1074	+9.6004	.9625
10	21 Pleiadum	8½	+52	—16	0 53.2	+ 6 31 47	+0.1644	.5536	+0.1074	+9.6132	.9600
10	23 Pleiadum	8½	+90	+49	0 54.6	+ 6 33 8	+1.2139	.5537	+0.1074	+9.5961	.9633
10	24 Pleiadum	8	+82	+ 4	0 54.9	+ 6 33 26	+0.5616	.5537	+0.1074	+9.6069	.9612
10	η Tauri	3½	+90	+15	0 55.0	+ 6 33 32	+0.7581	.5537	+0.1073	+9.6037	.9618
10	25 Pleiadum	8½	+90	+63	0 59.0	+ 6 37 20	+1.2945	.5537	+0.1073	+9.5949	.9635
10	27 Pleiadum	8½	+82	+ 5	1 14.2	+ 6 52 2	+0.5615	.5537	+0.1069	+9.6074	.9611
10	29 Pleiadum	8	+80	+ 4	1 21.4	+ 6 58 49	+0.5448	.5538	+0.1066	+9.6079	.9610
10	s Pleiadum	7½	+90	+37	1 33.8	+ 7 10 54	+1.0867	.5540	+0.1061	+9.5993	.9627
10	f Pleiadum	4½	+90	+23	1 39.2	+ 7 16 11	+0.8868	.5541	+0.1058	+9.6028	.9620
10	31 Pleiadum	8	+79	+ 3	1 41.8	+ 7 18 41	+0.5238	.5542	+0.1057	+9.6087	.9608
10	32 Pleiadum	8	+80	+ 4	1 44.0	+ 7 20 48	+0.5438	.5542	+0.1056	+9.6085	.9609
10	33 Pleiadum	8½	+90	+12	1 46.1	+ 7 22 46	+0.6897	.5542	+0.1055	+9.6063	.9613
10	34 Pleiadum	7½	+90	+58	1 54.5	+ 7 30 52	+1.2764	.5544	+0.1052	+9.5967	.9632
10	35 Pleiadum	9	+90	+13	1 54.9	+ 7 31 18	+0.7081	.5545	+0.1051	+9.6062	.9613
10	36 Pleiadum	9	+90	+15	1 58.8	+ 7 35 1	+0.7433	.5545	+0.1050	+9.6057	.9615
10	37 Pleiadum	8	+86	+ 7	1 59.3	+ 7 35 35	+0.6030	.5545	+0.1050	+9.6080	.9610
10	38 Pleiadum	8	+90	+42	2 0.7	+ 7 35 53	+1.1400	.5545	+0.1049	+9.5993	.9627
10	B.A.C. 1192	6½	+ 3	—64	2 7.3	+ 7 43 19	—0.7009	0.5546	+0.1046	+9.6284	9.9567



## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North-ern.	South-ern.		H	Y	P'	Q'	Log sin D	Log cos D
					h. m.	h. m. s.					
Aug. 10	39 Pleiadum	8	+74	0	2 12.8	+ 7 48 33	+0.4685	0.5548	+1.044	+9.6104	9.9605
10	40 Pleiadum	7½	+90	+35	2 24.2	+ 7 59 36	+1.0575	.5549	+1.039	+9.6013	.9623
10	$\gamma$ Tauri	5½	+67	-2	15 58.5	- 2 55 22	+0.3781	.5646	+0.723	+9.6308	.9562
12	136 Tauri	5	-33	-63	1 51.8	+ 8 33 31	-1.1458	.5840	-.0281	+9.6655	.9477
12	139 Tauri	5½	+76	+ 8	6 45.5	+10 22 43	+0.4957	.5847	-0.0338	+9.6408	.9539
13	$\alpha$ Geminor.	3½	+48	-17	0 52.8	+ 3 47 0	+0.0938	.5871	-.0858	+9.6303	.9563
14	$\mu^2$ Cancr	5	-16	-68	10 13.4	+11 48 51	-0.9683	.5814	-.1742	+9.5783	.9672
17	$d$ Leonis	5	-13	-66	11 43.6	+10 37 20	-1.0148	.5542	-.2751	+8.8820	9.9987
17	$\eta^2$ Leonis	5	+90	+ 2	17 36.3	- 7 42 14	+0.8406	.5519	-0.2762	+8.0797	0.0000
18	$\nu$ Leonis	4½	-21	-90	8 56.2	+ 2 15 12	-1.1371	.5521	-.2758	-6.9756	0.0000
20	69 Virginis	5½	+73	+31	4 44.5	+ 1 22 18	+1.2232	.5561	-.2342	-9.4200	9.9844
20	89 Virginis	5½	+73	+34	14 24.2	+10 41 18	+1.2365	.5600	-.2185	-9.4767	.9795
22	42 Libræ	5½	-10	-90	12 35.2	+ 7 10 5	-0.6685	.5725	-.1185	-9.5983	.9629
22	$b$ Scorpii	5	+65	+ 8	16 55.9	+11 20 56	+0.8700	.5731	-1.076	-9.6312	.9561
22	A Scorpii	5	+41	-24	18 1.2	-11 36 14	+0.3234	.5733	-1.048	-9.6244	.9576
22	$\pi$ Scorpii	3½	+65	+13	20 8.7	- 9 33 34	+0.9378	.5737	-.1012	-9.6373	.9548
22	B.A.C. 5347	5	+64	+ 6	23 55.4	- 5 54 25	+0.8347	.5741	-.0893	-9.6411	.9538
23	$\sigma$ Scorpii	3½	+ 4	-63	5 17.1	- 0 45 59	-0.3296	.5745	-.0753	-9.6301	.9564
23	$\alpha$ Scorpii	1½	+39	-24	8 37.2	+ 2 26 32	+0.3378	.5742	-.0659	-9.6437	.9532
23	22 Scorpii	5	-40	-90	8 58.7	+ 2 47 17	-1.0602	.5742	-.0651	-9.6228	.9580
24	A Ophiuchi	5	+ 9	-52	3 28.2	- 3 25 16	-0.1363	.5723	-.0146	-9.6479	.9522
25	$\lambda$ Sagittarii	3	+ 4	-53	9 56.4	+ 1 55 20	-0.3203	.5614	+0.0646	-9.6339	.9555
26	$\gamma^1$ Sagittarii	5½	+65	+54	11 15.3	+ 3 20 52	+1.2930	.5471	+1.1220	-9.6226	.9581
26	$\gamma^2$ Sagittarii	6	+66	- 2	11 22.5	+ 2 27 55	+0.7178	.5468	+1.226	-9.6133	.9599
27	$\sigma$ Capricor.	5½	- 2	-90	12 47.4	+ 3 2 44	-0.6480	.5303	+1.1690	-9.5246	.9742
27	$\pi$ Capricor.	5	-19	-90	16 40.2	+ 6 48 11	-0.9486	.5277	+1.752	-9.5052	.9765
27	$\epsilon$ Capricor.	5	-43	-90	17 26.1	+ 7 32 37	-1.2454	.5272	+1.780	-9.4962	.9775
27	$\nu$ Capricor.	5½	+41	-35	22 57.2	-11 6 36	+0.1370	.5237	+1.1843	-9.5043	.9767
28	29 Capricor.	6	+68	-12	17 9.0	+ 6 32 17	+0.5650	.5131	+0.2067	-9.4335	.9834
29	$\lambda$ Capricor.	5½	+36	-46	9 27.6	- 1 37 27	-0.0620	.5048	+0.2229	-9.3181	.9904
30	$\delta$ Aquarii	4½	+31	-53	1 58.3	- 9 34 26	-0.1864	.4983	+0.2343	-9.1684	.9952
30	$\epsilon$ Aquarii	5½	+57	-27	3 49.9	- 7 44 56	+0.2982	.4977	+0.2354	-9.1705	.9952
30	$\pi$ Aquarii	5	-42	-90	13 37.6	+ 1 45 40	-1.3360	.4948	+0.2398	-8.9353	9.9984
31	$\pi$ Piscium	4½	+ 9	-34	17 20.9	+ 4 44 20	-0.6360	.4907	+0.2447	+7.9379	0.0000
Sept. 1	$\lambda$ Piscium	5	+90	+ 4	1 55.6	-10 54 41	+0.8828	.4907	+0.2441	-8.2492	9.9999
3	$\gamma$ Piscium	4	+27	- 3	14 8.2	- 0 21 18	-0.2976	.5068	+0.2090	+9.4024	.9857
3	101 Piscium	6	+90	+13	16 24.1	+ 1 50 40	+0.9247	.5086	+0.2074	+9.3822	.9870
5	$\alpha$ Arietis	4½	+90	+20	9 57.3	- 5 52 16	+0.9152	.5332	+1.1494	+9.5500	.9708
6	$\epsilon$ Pleiadum	5½	+61	-10	6 55.9	- 9 35 29	+0.2932	.5473	+1.087	+9.6068	.9612
6	$\delta$ Pleiadum	4½	+75	0	6 58.1	- 9 33 22	+0.4875	.5473	+1.086	+9.6037	.9618
6	$\pi$ Pleiadum	7	+26	-40	7 4.7	- 9 26 58	-0.2871	.5474	+1.086	+9.6161	.9594
6	$\alpha$ Tauri	5	+50	-19	7 6.5	- 9 25 15	+0.1192	.5474	+1.082	+9.6097	.9607
6	1 Pleiadum	8	+85	+ 6	7 13.2	- 9 18 33	+0.5972	.5475	+1.080	+9.6024	.9621
6	2 Pleiadum	8½	+51	-18	7 16.3	- 9 15 47	+0.1392	.5475	+1.078	+9.6098	.9607
6	3 Pleiadum	9	+81	+ 4	7 17.4	- 9 14 43	+0.5522	.5475	+1.078	+9.6032	.9619
6	4 Pleiadum	8	+60	-10	7 18.0	- 9 14 9	+0.2804	.5475	+1.078	+9.6076	.9611
6	5 Pleiadum	9	+41	-26	7 18.6	- 9 13 34	-0.0338	.5475	+1.077	+9.6125	.9601
6	6 Pleiadum	9	+63	- 7	7 19.7	- 9 12 31	+0.3337	.5475	+1.076	+9.6068	.9612
6	$c$ Pleiadum	5	+58	-11	7 23.4	- 9 8 58	+0.2551	.5476	+1.074	+9.6082	.9610
6	7 Pleiadum	8	+87	+ 7	7 24.8	- 9 7 35	+0.6125	.5476	+1.073	+9.6025	.9621
6	$z$ Pleiadum	7½	+46	-22	7 25.3	- 9 7 6	+0.0559	.5476	+1.073	+9.6113	.9603
6	1 Pleiadum	7½	+47	-20	7 29.2	- 9 3 20	+0.0915	.5476	+1.073	+9.6109	.9604
6	9 Pleiadum	8½	+72	- 2	7 35.5	- 8 57 17	+0.4494	.5477	+1.071	+9.6051	.9616
6	$d$ Pleiadum	5	+90	+14	7 37.4	- 8 55 23	+0.7324	.5477	+1.071	+9.6009	.9624
6	10 Pleiadum	8	+68	- 4	7 40.4	- 8 52 31	+0.4024	0.5477	+1.070	+9.6063	9.9613



**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of δ.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
			°	°	h. m.	h. m. a.					
Sept. 6	11 Pleiadum	8½	+83	+5	7 46.0	— 8 47 4	+0.5789	0.5478	+1.068	+9.6037	.9618
6	12 Pleiadum	7½	+51	—17	7 54.5	— 8 38 56	+0.1420	.5479	+1.066	+9.6107	.9604
6	13 Pleiadum	8½	+90	+13	7 57.3	— 8 36 9	+0.7114	.5479	+1.065	+9.6018	.9622
6	14 Pleiadum	9	+90	+29	8 0.0	— 8 33 36	+0.9670	.5479	+1.065	+9.5978	.9629
6	15 Pleiadum	8½	+84	+5	8 2.7	— 8 30 59	+0.5795	.5479	+1.065	+9.6041	.9618
6	16 Pleiadum	9½	+90	+25	8 3.2	— 8 30 30	+0.9166	.5479	+1.064	+9.5987	.9628
6	17 Pleiadum	8	+90	+39	8 3.8	— 8 29 55	+1.0165	.5479	+1.064	+9.5971	.9631
6	18 Pleiadum	8	+83	+5	8 3.9	— 8 29 49	+0.5698	.5480	+1.064	+9.6043	.9617
6	p Pleiadum	7½	+85	+6	8 4.7	— 8 29 3	+0.5957	.5480	+1.063	+9.6039	.9618
6	19 Pleiadum	8	+90	+40	8 5.1	— 8 28 39	+1.1151	.5480	+1.063	+9.5955	.9634
6	20 Pleiadum	8	+47	—20	8 5.4	— 8 28 23	+0.0862	.5480	+1.063	+9.6120	.9602
6	21 Pleiadum	8	+90	+19	8 6.2	— 8 27 37	+0.8136	.5480	+1.063	+9.6005	.9625
6	22 Pleiadum	8½	+43	—24	8 6.5	— 8 27 21	+0.0142	.5480	+1.063	+9.6131	.9600
6	23 Pleiadum	8½	+90	+36	8 7.9	— 8 25 57	+1.0747	.5480	+1.062	+9.5962	.9632
6	24 Pleiadum	8	+69	—3	8 8.2	— 8 25 39	+0.4157	.5480	+1.062	+9.6069	.9612
6	γ Tauri	3½	+87	+7	8 8.8	— 8 25 33	+0.6144	.5480	+1.062	+9.6037	.9618
6	25 Pleiadum	8½	+90	+43	8 12.4	— 8 21 39	+1.1558	.5480	+1.061	+9.5949	.9635
6	27 Pleiadum	8½	+69	—3	8 27.9	— 8 6 38	+0.4155	.5481	+1.056	+9.6074	.9611
6	29 Pleiadum	8	+68	—4	8 35.3	— 7 59 31	+0.3981	.5482	+1.053	+9.6079	.9610
6	ε Pleiadum	7½	+90	+27	8 47.9	— 7 47 22	+0.9461	.5483	+1.049	+9.5995	.9626
6	ζ Pleiadum	4½	+90	+15	8 53.5	— 7 41 54	+0.7444	.5483	+1.047	+9.6028	.9620
6	η Pleiadum	5½	+90	+10	8 54.1	— 7 41 24	+0.6546	.5483	+1.047	+9.6044	.9617
6	30 Pleiadum	8½	+90	+24	8 54.8	— 7 40 41	+0.9260	.5483	+1.047	+9.6000	.9625
6	31 Pleiadum	8	+66	—5	8 56.1	— 7 39 22	+0.3775	.5483	+1.046	+9.6087	.9608
6	32 Pleiadum	8	+68	—4	8 58.4	— 7 37 12	+0.3974	.5483	+1.046	+9.6086	.9609
6	33 Pleiadum	8½	+80	+4	9 0.5	— 7 35 13	+0.5448	.5483	+1.045	+9.6062	.9613
6	34 Pleiadum	7½	+90	+39	9 9.1	— 7 26 53	+1.1879	.5484	+1.042	+9.5970	.9631
6	35 Pleiadum	9	+82	+5	9 9.5	— 7 26 27	+0.5636	.5484	+1.042	+9.6062	.9613
6	36 Pleiadum	9	+86	+7	9 13.5	— 7 22 39	+0.5991	.5487	+1.040	+9.6057	.9615
6	37 Pleiadum	8	+73	0	9 14.0	— 7 22 5	+0.4572	.5487	+1.040	+9.6080	.9610
6	38 Pleiadum	8	+90	+31	9 15.6	— 7 20 44	+1.0000	.5487	+1.039	+9.5993	.9627
6	B.A.C. 1192	6½	—8	—65	9 22.2	— 7 14 10	—0.8608	.5488	+1.036	+9.6285	.9567
6	39 Pleiadum	8	+63	—8	9 27.8	— 7 8 45	+0.3217	.5489	+1.033	+9.6106	.9605
6	40 Pleiadum	7½	+90	+26	9 29.5	— 6 57 29	+0.9171	.5491	+1.027	+9.6014	.9623
6	χ Tauri	5½	+57	—9	23 33.2	+ 6 27 2	+0.2305	.5580	+0.0356	+9.6308	.9563
8	139 Tauri	5½	+66	+1	15 27.8	— 3 7 8	+0.3618	.5750	—0.0329	+9.6408	.9539
9	α Geminor.	3½	+41	—24	10 8.9	— 9 8 56	—0.0342	.5782	—0.0836	+9.6303	.9563
9	ω Geminor.	6	+51	—17	17 39.9	— 1 55 16	+0.1420	.5780	—0.1050	+9.6162	.9594
10	μ² Cancri	5	—22	—68	20 25.1	— 0 11 20	—1.0775	.5738	—0.1710	+9.5733	.9672
11	δ Cancri	6	+80	—4	6 22.4	+ 9 23 34	+0.5616	.5713	—0.1930	+9.5030	.9768
11	B.A.C. 2854	6½	+24	—51	6 23.2	+ 9 24 22	—0.3369	.5713	—0.1930	+9.5225	.9745
11	δ Cancri	4	+9	—69	11 50.2	— 9 20 54	—0.6224	.5699	—0.2039	+9.5052	.9765
11	α³ Cancri	6	+90	+6	17 17.9	— 4 5 17	+0.7849	.5685	—0.2141	+9.4434	.9826
12	α Leonis	5	—14	—80	23 28.5	+ 0 59 33	—1.0219	.5607	—0.2583	+9.2679	.9924
16	89 Virginis	5½	+73	+54	23 24.9	— 2 30 3	+1.2496	.5682	—0.2203	—9.4767	.9796
18	42 Libræ	5½	+1	—74	20 5.8	— 7 31 33	—0.4813	.5821	—0.1229	—9.5983	.9629
19	δ Scorpii	5	+65	+21	0 18.8	— 3 28 28	+1.0373	.5825	—0.1091	—9.6312	.9561
19	α Scorpii	5	+52	—14	1 22.1	— 2 27 36	+0.4993	.5825	—0.1055	—9.6244	.9576
19	π Scorpii	3½	+65	+27	3 26.1	— 0 28 31	+1.1066	.5828	—0.1000	—9.6372	.9548
19	B.A.C. 5347	5	+64	+18	7 6.5	+ 3 3 16	+1.0055	.5825	—0.0904	—9.6411	.9538
19	σ Scorpii	8½	+14	—51	12 19.5	+ 8 4 2	—0.1397	.5825	—0.0760	—9.6301	.9564
19	α Scorpii	1½	+50	—13	15 34.4	+11 11 23	+0.5190	.5825	—0.052	—9.6437	.9532
19	22 Scorpii	5	—26	—90	15 55.5	+11 31 35	—0.8596	.5823	—0.0556	—9.6228	.9580
20	α Ophiuchi	5	+19	—39	9 59.8	+ 4 53 49	+0.0553	.5782	—0.0151	—9.6479	.9522
21	λ Sagittarii	3	+14	—50	16 0.0	+ 9 46 24	—0.1294	0.5640	+0.0643	—9.6339	.9555



## ELEMENTS FOR FACILITATING THE CALCULATION OF ECLIPSATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washing- ton Mean Time of C.	At Washington Mean Time of Conjunction.							
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D		
Sept. 22	B.A.C. 6576	6	+57	-11	12 45.6	+ 5 47 41	+0.5630	0.5505	+1.123	-9.6163	9.9598		
23	B.A.C. 6889	6	+68	-2	11 38.6	+ 8 54 47	+0.7258	.5341	+1.562	-9.5679	.9681		
23	α Capricor.	5½	+ 6	-74	18 38.2	+10 40 54	-0.4869	.5292	+1.677	-9.5246	.9742		
23	π Capricor.	5	- 9	-90	22 31.8	- 9 33 19	-0.7907	.5265	+1.736	-9.5052	.9765		
23	ρ Capricor.	5	-29	-90	23 17.2	- 8 48 47	-1.0872	.5260	+1.745	-9.4962	.9775		
24	ν Capricor.	5½	+49	-27	4 48.9	- 8 27 25	+0.2867	.5224	+1.826	-9.5043	.9767		
24	B.A.C. 7202	6	+72	+27	9 0.1	+ 0 36 3	+1.1548	.5199	+1.882	-9.5062	.9764		
25	λ Capricor.	5½	+41	-40	15 26.1	+ 6 8 27	+0.0417	.5035	+2.207	-9.3179	.9904		
26	δ Aquarii	4½	+35	-48	8 0.0	- 1 45 18	-0.1105	.4973	+2.819	-9.1683	.9952		
26	ρ Aquarii	5½	+62	-28	9 52.1	+ 0 3 39	+0.3715	.4969	+2.331	-9.1705	.9952		
26	κ Aquarii	5	-36	-90	19 40.9	+ 9 36 26	-1.2880	.4941	+2.375	-8.9352	9.9984		
27	κ Piscium	4½	+ 9	-84	23 24.9	-11 24 13	-0.6371	.4912	+2.431	+7.9384	0.0000		
28	λ Piscium	5	+90	+ 4	7 58.9	- 3 4 3	+0.8650	.4918	+2.426	+8.2494	9.9999		
28	22 Piscium	6	+90	+ 9	13 34.1	+ 2 22 11	+0.9462	.4922	+2.415	+8.5764	.9997		
30	η Piscium	4	+19	-61	19 57.3	+ 7 15 11	-0.4336	.5095	+2.091	-9.4025	.9857		
Oct. 2	μ Arietis	5½	+90	+22	7 37.9	- 6 8 49	+0.9663	.5298	+1.619	+9.5218	.9746		
2	κ Arietis	4½	+90	+ 9	15 41.5	+ 1 39 16	+0.7185	.5346	+1.482	+9.5500	.9708		
3	9 Tauri	6	+90	+22	9 13.5	- 5 23 19	+0.8833	.5473	+1.154	+9.5874	.9648		
3	γ Pleiadum	5½	+47	-21	12 45.7	- 1 58 16	+0.0737	.5470	+1.074	+9.6068	.9612		
3	δ Pleiadum	4½	+59	-11	12 47.9	- 1 56 9	+0.2691	.5470	+1.074	+9.6037	.9618		
3	m Pleiadum	7	+14	-54	12 54.7	- 1 49 38	-0.5089	.5471	+1.073	+9.6161	.9594		
3	s Tauri	5	+37	-30	12 56.4	- 1 47 57	-0.1012	.5471	+1.072	+9.6098	.9607		
3	c Pleiadum	5	+44	-23	13 13.3	- 1 31 36	+0.0352	.5473	+1.065	+9.6082	.9610		
3	k Pleiadum	7½	+33	-33	13 15.3	- 1 29 44	-0.1651	.5473	+1.064	+9.6113	.9603		
3	l Pleiadum	7½	+35	-31	13 19.1	- 1 26 0	-0.1115	.5474	+1.063	+9.6109	.9604		
3	d Pleiadum	5	+77	+ 2	13 27.5	- 1 17 52	+0.5150	.5475	+1.059	+9.6009	.9623		
3	12 Pleiadum	7½	+38	-29	13 44.7	- 1 1 16	-0.0789	.5477	+1.052	+9.6108	.9604		
3	p Pleiadum	7½	+66	- 5	13 55.1	- 0 51 17	+0.3774	.5478	+1.047	+9.6039	.9618		
3	η Tauri	3½	+68	- 4	13 58.7	- 0 47 49	+0.3959	.5478	+1.046	+9.6037	.9618		
3	28 Pleiadum	7	+90	+46	14 23.0	- 0 24 17	+1.1784	.5481	+1.036	+9.5918	.9641		
3	s Pleiadum	7½	+90	+14	14 38.6	- 0 9 16	+0.7290	.5483	+1.030	+9.5995	.9626		
3	f Pleiadum	4½	+78	+ 3	14 44.2	- 0 3 47	+0.5258	.5484	+1.027	+9.6029	.9620		
3	h Pleiadum	5½	+71	- 2	14 44.8	- 0 3 16	+0.4362	.5484	+1.027	+9.6043	.9617		
3	34 Pleiadum	7½	+90	+26	14 59.9	+ 0 11 21	+0.9217	.5486	+1.021	+9.5970	.9631		
3	B.A.C. 1192	6½	-25	-85	15 13.2	+ 0 24 10	-1.0874	.5487	+1.015	+9.6284	.9567		
3	40 Pleiadum	7½	+90	+13	15 30.6	+ 0 41 1	+0.6990	.5489	+1.008	+9.6014	.9623		
4	χ Tauri	5½	+42	-21	5 33.1	- 9 45 45	-0.0003	.5564	+0.0699	+9.6308	.9562		
5	125 Tauri	6	+69	+ 6	14 34.3	- 1 56 4	+0.4152	.5678	-0.0129	+9.6390	.9543		
5	139 Tauri	5½	+49	-11	22 13.8	+ 5 26 27	+0.1173	.5703	-0.0322	+9.6408	.9539		
6	ε Geminor.	3½	+26	-37	17 27.1	- 0 3 5	-0.2833	.5694	-0.0826	+9.6303	.9563		
8	δ Cancri	6	+63	-15	15 12.4	- 3 58 34	+0.3491	.5612	-1.879	+9.5029	.9768		
8	δ Cancri	4	- 5	-72	20 51.9	+ 1 28 46	-0.8502	.5612	-1.994	+9.5052	.9765		
10	A Leonis	5	-27	-80	9 39.2	-11 1 38	-1.1888	.5526	-2.526	+9.2678	.9924		
10	43 Leonis	6	+72	-15	16 25.6	- 4 29 20	+0.4939	.5523	-2.591	+9.1010	.9965		
11	δ Leonis	5	-19	-86	9 13.5	+11 43 44	-1.0982	.5523	-2.696	+8.8814	9.9987		
11	ρ Leonis	5	+90	+ 8	15 8.3	- 6 33 48	+0.9268	.5530	-2.715	+8.0795	0.0000		
12	ν Leonis	4½	-22	-90	1 26.1	+ 3 22 28	-1.1439	.5547	-2.726	-6.9792	0.0000		
16	42 Libræ	5½	+11	-80	5 47.3	+ 3 57 59	-0.2837	.5924	-1.204	-9.5983	9.9629		
16	B.A.C. 5197	6	+46	-21	7 54.9	+ 6 0 24	+0.3851	.5925	-1.145	-9.6140	.9588		
16	δ Scorpii	5	+65	+41	9 53.1	+ 7 53 50	+1.2207	.5926	-1.091	-9.6312	.9561		
16	A Scorpii	5	+64	- 3	10 54.7	+ 8 52 55	+0.6913	.5928	-1.061	-9.6244	.9576		
16	B.A.C. 5347	5	+64	+39	16 28.8	- 9 46 28	+1.1998	.5931	-0.897	-9.6411	.9588		
16	α Scorpii	3½	+25	-38	21 32.5	- 4 55 0	+0.0779	.5929	-0.754	-9.6301	.9597		
17	α Scorpii	1½	+64	0	0 41.6	- 1 53 31	+0.7323	.5926	-0.664	-9.6437	.9587		
17	22 Scorpii	5	-13	-89	1 2.0	- 1 33 56	-0.6269	0.5928	-0.656	-9.6227	.9590		



ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.						
			North- ern.	South- ern.		H	Y	P'	q'	Log sin D	Log cos D	
					h. m.	h. m. s.						
Oct. 17	A Ophiuchi	5	+82	-25	18 34.0	- 8 44 2	+0.2977	0.5882	-.0141	-9.6479	9.9522	
18	$\lambda$ Sagittarii	3	+28	-34	23 45.4	- 4 40 30	+0.1423	.5717	+0.0658	-9.6339	.9555	
19	B.A.C. 6389	6	+39	-25	6 49.1	+ 2 7 31	+0.2072	.5665	+0.0838	-9.6284	.9567	
21	$\sigma$ Capricor.	5 $\frac{1}{2}$	+21	-54	1 27.1	- 4 42 36	-0.2003	.5321	+0.1680	-9.5246	.9742	
21	$\pi$ Capricor.	5	+ 6	-75	5 18.0	- 0 59 5	-0.5018	.5293	+0.1735	-9.5052	.9765	
21	$\epsilon$ Capricor.	5	-10	-90	6 3.4	- 0 15 7	-0.7949	.5288	+0.1747	-9.4962	.9775	
21	$\nu$ Capricor.	5 $\frac{1}{2}$	+65	-11	11 31.7	+ 5 2 56	+0.5669	.5261	+0.1832	-9.5043	.9767	
22	$\lambda$ Capricor.	5 $\frac{1}{2}$	+55	-26	21 56.5	- 9 38 32	+0.2943	.5080	+0.2191	-9.3180	.9904	
23	$\delta$ Aquarii	4 $\frac{1}{2}$	+47	-36	14 28.7	+ 6 30 51	+0.1197	.4967	+0.2306	-9.1684	.9952	
23	$\epsilon$ Aquarii	5 $\frac{1}{2}$	+77	-11	16 20.5	+ 8 19 35	+0.5969	.4961	+0.2306	-9.1704	.9952	
24	$\pi$ Aquarii	5	-18	-90	2 9.1	- 6 7 48	-1.0691	.4934	+0.2353	-9.3353	.99984	
25	$\pi$ Piscium	4 $\frac{1}{2}$	+17	-71	5 53.0	- 3 8 38	-0.4814	.4906	+0.2404	+7.9384	0.0000	
25	$\lambda$ Piscium	5	+90	+12	14 26.6	+ 5 11 15	+0.9982	.4916	+0.2401	+8.2434	.99999	
26	45 Piscium	6	+55	-29	14 51.3	+ 4 56 22	+0.2346	.4967	+0.2328	+9.0812	.9968	
28	$\eta$ Piscium	4	+18	-62	2 11.4	- 8 43 18	-0.4487	.5119	+0.2076	+9.4024	.9857	
29	$\mu$ Arietis	5 $\frac{1}{2}$	+90	+16	13 33.8	+ 1 34 27	+0.8626	.5336	+0.1608	+9.5218	.9746	
29	$\epsilon$ Arietis	4 $\frac{1}{2}$	+84	+ 2	21 32.8	+ 9 18 4	+0.5974	.5386	+0.1469	+9.5500	.9708	
30	$\theta$ Tauri	6	+90	+12	14 55.6	+ 2 6 7	+0.7234	.5492	+0.1136	+9.5874	.9648	
30	$g$ Pleiadum	5 $\frac{1}{2}$	+38	-28	18 25.9	+ 5 29 18	-0.0877	.5512	+0.1062	+9.6068	.9612	
30	$b$ Pleiadum	4 $\frac{1}{2}$	+48	-19	18 28.1	+ 5 31 28	+0.1072	.5512	+0.1059	+9.6037	.9618	
30	$\alpha$ Tauri	5	+27	-39	18 36.5	+ 5 39 34	-0.2624	.5513	+0.1058	+9.6008	.9607	
30	$c$ Pleiadum	5	+35	-31	18 53.3	+ 5 55 47	-0.1866	.5513	+0.1053	+9.6082	.9610	
30	$d$ Pleiadum	5	+64	- 6	19 8.4	+ 6 10 18	+0.3533	.5514	+0.1048	+9.6010	.9623	
30	$\eta$ Tauri	3 $\frac{1}{2}$	+56	-12	19 38.4	+ 6 39 15	+0.2319	.5519	+0.1035	+9.6037	.9618	
30	$f$ Pleiadum	4 $\frac{1}{2}$	+65	- 5	20 28.5	+ 7 22 53	+0.3600	.5523	+0.1018	+9.6029	.9620	
30	$A$ Pleiadum	5 $\frac{1}{2}$	+59	-10	20 24.0	+ 7 24 22	+0.2708	.5523	+0.1017	+9.6043	.9617	
31	$\chi$ Tauri	5 $\frac{1}{2}$	+42	-21	10 54.5	- 2 36 32	-0.0033	.5594	+0.0690	+9.6276	.9569	
Nov. 1	$k$ Tauri	5 $\frac{1}{2}$	+90	+44	2 27.2	-11 37 13	+0.1022	.5678	+0.0309	+9.6232	.9579	
2	139 Tauri	5 $\frac{1}{2}$	+34	-25	3 44.3	-11 15 43	-0.1323	.5691	-0.0337	+9.6408	.9539	
2	$\alpha$ Geminor.	3 $\frac{1}{2}$	+11	-54	23 6.6	+ 7 23 48	-0.5542	.5677	-0.0828	+9.6303	.9563	
3	$\delta$ Geminor.	3 $\frac{1}{2}$	+90	+34	14 34.4	- 1 42 20	+1.0568	.5642	-0.1205	+9.5779	.9664	
4	$d^1$ Cancri	6	+75	- 6	18 7.0	+ 0 51 9	+0.5085	.5554	-0.1804	+9.5077	.9763	
5	$\delta$ Cancri	4	-27	-72	3 34.9	+ 9 59 20	-1.1497	.5518	-0.1967	+9.5051	.9766	
7	$d$ Leonis	5	-43	-86	18 1.0	- 1 40 58	-1.3421	.5425	-0.2628	+8.8813	.99987	
8	$e^1$ Leonis	5	+90	- 4	0 8.2	+ 4 14 0	+0.7293	.5432	-0.2647	+8.0788	0.0000	
8	$\nu$ Leonis	4 $\frac{1}{2}$	-44	-90	10 46.7	- 9 28 56	-1.3527	.5458	-0.2658	-6.9866	0.0000	
14	A Ophiuchi	5	+43	-15	4 46.7	+ 3 16 48	+0.4703	.5958	-0.0124	-9.6479	9.9522	
14	$\delta$ Ophiuchi	3 $\frac{1}{2}$	-50	-90	7 21.0	+ 5 44 49	-1.1280	.5951	-0.0053	-9.6236	.9578	
15	$\lambda$ Sagittarii	3	+41	-21	9 19.9	+ 6 42 3	+0.3691	.5805	+0.0677	-9.6329	.9555	
17	$\sigma$ Capricor.	5 $\frac{1}{2}$	+36	-37	9 53.7	+ 5 31 51	+0.0946	.5385	+0.1702	-9.5246	.9742	
17	$\pi$ Capricor.	5	+22	-54	13 39.5	+ 9 10 16	-0.3018	.5354	+0.1761	-9.5052	.9765	
17	$\epsilon$ Capricor.	5	+ 7	-74	14 24.1	+ 9 53 22	-0.4933	.5346	+0.1772	-9.4962	.9775	
17	$\nu$ Capricor.	5 $\frac{1}{2}$	+72	+ 6	19 46.0	- 8 54 59	+0.8598	.5301	+0.1848	-9.5043	.9767	
19	$\lambda$ Capricor.	5 $\frac{1}{2}$	+74	-10	5 39.3	- 0 3 8	+0.6034	.5062	+0.2199	-9.3181	.9904	
19	B.A.C. 7620	6	+56	-26	9 26.2	+ 3 37 25	+0.3084	.5037	+0.2227	-9.2793	.9920	
19	$\delta$ Aquarii	4 $\frac{1}{2}$	+65	-20	22 1.7	- 8 8 22	+0.4224	.4985	+0.2299	-9.1684	.9952	
19	$\epsilon$ Aquarii	5 $\frac{1}{2}$	+82	+ 6	23 52.6	- 6 20 32	+0.8962	.4977	+0.2308	-9.1705	.9952	
20	$\alpha$ Aquarii	5	+ 1	-90	9 37.4	+ 3 8 10	+0.7685	.4942	+0.2348	-8.9353	.99984	
21	$\pi$ Piscium	4 $\frac{1}{2}$	+31	-54	13 15.5	+ 6 1 31	-0.2167	.4903	+0.2389	+7.9382	0.0000	
21	$\lambda$ Piscium	5	+90	+38	21 48.5	- 9 39 13	+1.2471	.4907	+0.2381	+8.2433	.99999	
24	$\eta$ Piscium	4	+25	-54	9 31.1	+ 0 24 5	-0.3188	.5120	+0.2047	+9.4024	.9857	
25	$\mu$ Arietis	5 $\frac{1}{2}$	+90	+19	20 43.4	+10 31 41	+0.9055	.5354	+0.1591	+9.5218	.9746	
26	$\epsilon$ Arietis	4 $\frac{1}{2}$	+87	+ 4	4 38.6	- 5 48 34	+0.6224	.5409	+0.1454	+9.5500	.9708	
27	$g$ Pleiadum	5 $\frac{1}{2}$	+36	-30	1 18.8	- 9 50 17	-0.1070	.5553	+0.1050	+9.6068	.9612	
27	$b$ Pleiadum	4 $\frac{1}{2}$	+47	-20	1 20.9	- 9 48 12	+0.0870	.5553	+0.1050	+9.6037	.9618	



ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1860.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		$H$	$Y$	$p'$	$q'$	Log sin $D$	Log cos $D$
Nov. 27	$\epsilon$ Tauri	5	+26	—0	1 29.2	—9 40 11	—0.2815	.5554	+1.042	+9.6099	9.9606
27	$c$ Pleiadum	5	+34	—32	1 45.8	—9 24 12	—0.1470	.5554	+1.037	+9.6082	.9610
27	$d$ Pleiadum	5	+62	—7	1 59.7	—9 10 44	+0.3286	.5554	+1.033	+9.6010	.9623
27	$\eta$ Tauri	3½	+54	—13	2 30.2	—8 41 17	+0.2080	.5559	+1.019	+9.6037	.9618
27	$f$ Pleiadum	4½	+63	—7	3 14.9	—7 58 10	+0.3339	.5560	+1.008	+9.6029	.9620
27	$h$ Pleiadum	5½	+57	—11	3 15.4	—7 57 41	+0.2443	.5559	+1.007	+9.6043	.9617
27	$\chi$ Tauri	5½	+28	—34	17 46.1	+6 2 8	—0.2469	.5543	+0.670	+9.6308	.9562
29	139 Tauri	5½	+31	—28	8 46.6	+4 26 9	—0.1870	.5670	—0.0296	+9.6408	.9539
30	$\epsilon$ Geminor.	3½	+1	—65	4 54.7	—9 0 48	—0.7180	.5729	—0.0853	+9.6303	.9563
30	B.A.C. 2338	6	+81	+6	8 19.8	—5 43 26	+0.5531	.5723	—0.0935	+9.6052	.9616
30	$\delta$ Geminor.	3½	+90	+21	20 12.2	+5 42 51	+0.8634	.5687	—1.224	+9.5779	.9664
Dec. 2	$\alpha^1$ Cancri	6	+64	—16	14 45.2	—1 14 50	+0.3656	.5503	—2.060	+9.4365	.9832
2	$\alpha^2$ Cancri	6	+46	—31	14 54.1	—1 6 19	+0.0686	.5503	—2.062	+9.4433	.9826
2	B.A.C. 3398	6	+88	+4	18 3.5	+1 8 26	+0.6719	.5401	—2.399	+9.3216	.9939
3	$\pi$ Leonis	5	+90	+23	19 50.0	+2 51 23	+1.1450	.5398	—2.509	+9.1801	.9950
4	34 Sextantis	6	+70	—17	15 51.4	—1 46 30	+0.4661	.5363	—2.558	+8.8921	9.9987
5	$\rho^2$ Leonis	5	+72	—16	6 37.2	—11 29 30	+0.4984	.5363	—2.601	+8.0779	0.0000
8	89 Virginis	5½	+73	+47	5 27.1	+9 56 21	+1.3192	.5645	—2.117	—9.4766	9.9796
10	42 Libræ	5½	+13	—56	2 15.1	+4 2 0	—0.2253	.5905	—1.157	—9.5983	.9629
10	$\Delta$ Scorpii	5	+65	+11	6 4.7	+7 42 2	+0.9001	.5920	—1.049	—9.6244	.9576
12	$\lambda$ Sagittarii	3	+48	—15	19 25.5	—5 24 11	+0.4749	.5969	+0.722	—9.6338	.9555
14	$\sigma$ Capricor.	5½	+47	—26	19 24.4	—7 9 28	+0.2653	.5442	+1.734	—9.5246	.9742
14	$\pi$ Capricor.	5	+31	—43	23 6.5	—3 34 41	—0.0248	.5411	+1.788	—9.5052	.9765
11	$\rho$ Capricor.	5	+16	—61	23 50.3	—2 52 19	—0.3185	.5406	+1.800	—9.4963	.9775
15	$\nu$ Capricor.	5½	+34	—42	4 53.6	+2 1 4	+0.0010	.5363	+1.874	—9.4827	.9790
16	$\lambda$ Capricor.	5½	+78	+2	14 27.5	+10 33 0	+0.8128	.5107	+2.224	—9.3180	.9904
17	$\delta$ Aquarii	4½	+80	—8	6 48.5	+2 26 15	+0.6436	.5022	+2.319	—9.1683	.9952
17	$\rho$ Aquarii	5½	+82	+21	8 46.2	+4 20 58	+1.1156	.5012	+2.327	—9.1705	.9952
17	$\kappa$ Aquarii	5	+13	—75	18 3.8	—10 37 40	—0.5383	.4975	+2.362	—8.9353	9.9984
18	$\kappa$ Piscium	4½	+42	—42	21 28.9	—7 57 17	+0.0079	.4914	+2.389	—7.9382	0.0000
20	45 Piscium	6	+85	—7	6 22.9	+0 3 26	+0.6443	.4945	+2.295	+9.0812	9.9968
21	$\eta$ Piscium	4	+34	—45	17 48.3	+10 29 8	—0.1537	.5094	+2.031	+9.4025	.9857
23	$\mu$ Arietis	5½	+90	+27	5 10.0	—3 13 52	+1.0368	.5328	+1.571	+9.5214	.9746
23	$\epsilon$ Arietis	4½	+90	+10	12 6.4	+4 27 3	+0.7264	.5389	+1.437	+9.5500	.9708
24	9 Tauri	6	+90	+17	6 19.2	—2 54 46	+0.7856	.5517	+1.109	+9.5874	.9648
24	$g$ Pleiadum	5½	+40	—26	9 46.9	+0 25 44	—0.0327	.5537	+1.032	+9.6068	.9612
24	$b$ Pleiadum	4½	+52	—16	9 49.2	+0 27 55	+0.1607	.5542	+1.031	+9.6037	.9618
24	$m$ Pleiadum	7	+8	—60	9 55.8	+0 34 15	—0.6113	.5543	+1.028	+9.6161	.9594
24	$e$ Tauri	5	+30	—35	9 57.5	+0 35 55	—0.2072	.5543	+1.028	+9.6099	.9606
24	$c$ Pleiadum	5	+38	—28	10 14.0	+0 51 53	—0.0739	.5546	+1.022	+9.6082	.9610
24	$d$ Pleiadum	5	+68	—3	10 27.9	+1 5 20	+0.4010	.5548	+1.016	+9.6010	.9623
24	$\eta$ Tauri	3½	+59	—9	10 58.4	+1 34 44	+0.2797	.5552	+1.005	+9.6037	.9618
24	28 Pleiadum	7	+90	+36	11 22.2	+1 57 45	+1.0634	.5556	+0.996	+9.5918	.9641
24	$f$ Pleiadum	4½	+68	—3	11 43.0	+2 17 45	+0.4045	.5559	+0.989	+9.6029	.9620
24	$h$ Pleiadum	5½	+62	—7	11 43.4	+2 18 10	+0.3156	.5559	+0.988	+9.6043	.9617
25	$\chi$ Tauri	5½	+31	—31	2 11.0	—7 45 7	—0.1953	.5648	+0.660	+9.6308	.9562
26	139 Tauri	5½	+27	—33	17 48.1	+6 23 18	—0.2711	.5794	—0.0375	+9.6409	.9539
27	$\epsilon$ Geminor.	3½	—1	—65	12 35.1	+0 27 22	—0.7433	.5784	—0.0878	+9.6303	.9563
27	B.A.C. 2338	6	+77	+3	15 56.3	+3 40 57	+0.5121	.5784	—0.0962	+9.6052	.9616
28	$\delta$ Geminor.	3½	+90	+17	3 34.0	—9 7 44	+0.8042	.5753	—1.255	+9.5779	.9664
29	$\alpha^1$ Cancri	6	+58	—21	21 9.5	+6 56 53	+0.3667	.5573	—2.094	+9.4364	.9832
30	$\alpha$ Leonis	3½	+90	+40	16 56.4	+2 2 48	+1.2770	.5489	—2.359	+9.2615	.9925
31	$\pi$ Leonis	5	+90	+16	1 40.5	+10 29 14	+1.0184	.5450	—2.447	+9.1801	.9939
31	B.A.C. 3529	6	+58	—26	11 5.5	—4 24 35	+0.2826	0.5421	—2.531	+9.0936	.9950

NOTE. — B. A. C., British Association Catalogue.



OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT  
WASHINGTON, D. C., DURING THE YEAR 1860.

Date.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.				Duration of Occultation.
			Washington		Angle from		Washington		Angle from		
			Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	
			h. m.	h. m.	°	°	h. m.	h. m.	°	°	h. m.
Jan.	4 m Pleiadum	7	5 34	10 38	290	342	6 51	11 55	89	147	1 17
	4 s Tauri	5	6 6	11 10	190	245	Star 3'2 south of		C's limb.		
	4 k Pleiadum	7½	6 31	11 35	188	246	Star 1'5 south of		C's limb.		
	4 l Pleiadum	7½	6 35	11 39	188	245	Star 1'5 south of		C's limb.		
	4 12 Pleiadum	7½	7 8	12 12	187	245	Star 3'3 south of		C's limb.		
	7 s Geminor.	3½	0 16	5 9	183	130	Star 4'6 south of		C's limb.		
	7 37 Geminor.	6	4 42	9 34	268	213	5 59	10 51	74	39	1 17
	7 48 Geminor.	6	13 7	17 58	272	326	13 53	18 45	52	102	0 47
Feb.	12 B.A.C. 4984	6	13 11	15 40	276	257	14 33	17 2	54	54	1 22
	16 s Sagittarii †	2½	13 28	15 42	267	218	14 36	16 50	93	48	1 08
	23 22 Piscium	6	4 30	6 18	268	317	5 25	7 13	148	198	0 55
Mar.	2 37 Geminor. †	6	5 38	6 54	277	234	6 56	8 13	58	68	1 18
	2 48 Geminor. †	6	13 59	15 14	244	293	14 58	16 13	75	118	0 59
	26 g Pleiadum	5½	9 54	9 35	258	311	10 48	10 29	109	158	0 54
	26 b Pleiadum	4½	10 10	9 51	210	261	10 33	10 14	158	207	0 23
	26 s Tauri	5	10 7	9 49	301	353	10 55	10 36	66	113	0 48
	26 2 Pleiadum †	8½	10 16	9 57	299	350	11 4	10 45	67	114	0 48
	26 3 Pleiadum	9	10 39	10 20	183	232	Star 0'8 south of		C's limb.		
	26 4 Pleiadum †	8	10 14	9 55	270	321	11 7	10 49	97	143	0 53
	26 5 Pleiadum	9	10 43	10 24	3	52	Star 1'2 north of		C's limb.		
	26 c Pleiadum †	5	10 19	10 0	276	327	11 12	10 53	90	136	0 53
	26 k Pleiadum †	7½	10 32	10 13	325	14	11 5	10 46	42	86	0 33
	26 l Pleiadum †	7½	10 32	10 13	315	5	11 11	10 52	51	97	0 39
	26 9 Pleiadum †	8½	10 36	10 17	232	281	11 15	10 56	135	180	0 39
	26 10 Pleiadum †	8	10 36	10 17	248	297	11 23	11 4	119	163	0 47
	26 11 Pleiadum	8½	11 4	10 45	183	228	Star 0'3 south of		C's limb.		
	26 12 Pleiadum †	7½	10 53	10 34	310	358	11 34	11 15	56	99	0 41
	26 15 Pleiadum *	8½	11 10	10 51	202	248	11 26	11 7	165	209	0 16
	26 18 Pleiadum *	8	11 9	10 50	208	254	11 30	11 11	159	203	0 21
	26 p Pleiadum *	7½	11 20	11 1	184	228	Star 0'0 south of		C's limb.		
	26 20 Pleiadum *	8	11 10	10 51	332	18	11 36	11 17	35	77	0 26
	26 21 Pleiadum *	8½	11 25	11 6	3	48	Star 1'8 north of		C's limb.		
	26 24 Pleiadum †	8	11 0	10 41	254	301	11 48	11 29	113	155	0 48
	26 7 Tauri *	3½	11 23	11 4	184	228	Star 0'8 south of		C's limb.		
	29 s Geminor.	3½	11 52	11 21	262	319	12 46	12 15	65	118	0 55
April	10 B.A.C. 6194	5½	15 24	14 5	309	277	16 29	15 10	51	31	1 5
	11 ψ Sagittarii	5	16 28	15 5	260	229	17 50	16 27	121	104	1 22
	13 19 Capricor.	6	16 30	14 59	358	313	16 54	15 23	37	355	0 24
	23 χ Tauri	5½	9 25	7 16	280	337	10 24	8 15	78	131	0 58
	24 VENUS	5½	10 46	8 33	200	256	11 16	9 3	142	196	0 30
May	5 b Scorpii	5	16 24	13 27	261	270	17 45	14 48	75	99	1 21
	29 g Virginis	6	14 49	10 18	282	315	15 41	11 10	17	56	0 52
June	5 χ¹ Sagittarii	5½	19 20	14 20	200	201	Star 1'7 south of		C's limb.		
	5 χ² Sagittarii	6½	19 4	14 4	237	234	19 55	14 55	165	173	0 52
	5 χ³ Sagittarii	6	19 36	14 36	344	347	20 29	15 29	58	74	0 53
	29 π Scorpii	3½	14 28	7 55	243	226	15 50	9 17	83	83	1 22
	29 B.A.C. 5347 †	5	19 51	13 17	268	310	20 57	14 23	90	138	1 6
July	4 B.A.C. 7202	6	19 58	13 4	271	269	21 14	14 20	151	165	1 16
	8 λ Piscium †	5	17 29	10 19	308	257	18 29	11 20	107	57	1 0
	13 g Pleiadum	5½	21 19	18 50	18	326	Star 1'3 north of		C's limb.		
	13 b Pleiadum	4½	20 52	13 22	313	262	21 40	14 11	84	30	0 49
	13 1 Pleiadum	8	20 59	13 29	287	236	21 53	14 23	110	56	0 54
	13 3 Pleiadum	9	21 2	13 32	295	244	21 57	14 27	103	48	0 54



## OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT WASHINGTON, D. C., DURING THE YEAR 1860.

Date.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.				Duration of Occultation.	
			Washington		Angle from		Washington		Angle from			
			Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.		
			h. m.	h. m.	°	°	h. m.	h. m.	°	°	h. m.	
July	13 4 Pleiadum	8	21 41	14 11	19	325	Star 0'0 north of	14 26	52	358	0 30	
	13 6 Pleiadum	9	21 25	13 55	345	293	21 56	14 26	52	358	0 30	
	13 c Pleiadum	5	21 46	14 16	19	325	Star 1'3 north of	14 34	117	62	0 55	
	13 7 Pleiadum	8	21 9	13 39	281	230	22 3	14 34	117	62	0 55	
	13 9 Pleiadum	8½	21 24	13 54	307	254	22 17	14 48	91	36	0 53	
	13 d Pleiadum	5	21 21	13 52	253	200	22 16	14 37	146	91	0 45	
	13 10 Pleiadum	8	21 34	14 4	321	268	22 22	14 52	78	22	0 48	
	13 11 Pleiadum	8½	21 29	13 59	282	229	22 25	14 55	116	60	0 56	
	13 13 Pleiadum	8½	21 41	14 11	250	197	22 25	14 55	149	93	0 45	
	13 15 Pleiadum	8½	21 45	14 15	278	224	22 42	15 12	122	65	0 57	
	13 18 Pleiadum	8	21 46	14 16	279	225	22 43	15 13	120	63	0 57	
	13 p Pleiadum	7½	21 46	14 17	274	220	22 43	15 13	126	69	0 56	
	13 22 Pleiadum	8½	22 9	14 39	200	144	Star 0'3 south of	15 22	92	34	0 56	
	13 24 Pleiadum	8	21 57	14 27	308	253	22 52	15 22	92	34	0 56	
	13 γ Tauri	3½	21 50	14 20	269	215	22 45	15 15	131	74	0 55	
	13 27 Pleiadum	8½	22 14	14 44	303	247	23 12	15 43	98	40	0 59	
	13 29 Pleiadum	8	22 22	14 52	304	248	23 21	15 51	97	39	1 0	
	13 f Pleiadum	4½	22 57	15 27	201	143	Star 0'5 south of	15 52	158	100	0 43	
	13 h Pleiadum	5½	22 39	15 9	243	186	23 22	15 52	158	100	0 43	
	13 31 Pleiadum	8	22 43	15 13	301	244	23 45	16 15	101	42	1 2	
	13 32 Pleiadum	8	22 44	15 14	296	239	23 47	16 17	105	47	1 3	
	13 33 Pleiadum	8½	22 42	15 12	267	210	23 41	16 11	135	77	0 58	
	13 35 Pleiadum	9	22 53	15 23	259	202	23 48	16 18	143	84	0 55	
	13 36 Pleiadum	9	22 58	15 28	250	192	23 47	16 17	153	94	0 49	
	13 37 Pleiadum	8	22 57	15 27	280	221	0 1	16 31	122	64	1 4	
	13 39 Pleiadum	8	23 17	15 47	300	242	0 23	16 53	101	42	1 6	
	Aug.	24 89 Virginis	5½	16 40	8 28	202	162	17 31	9 19	114	81	0 51
		10 γ Tauri	5½	23 39	14 19	312	254	0 40	15 19	83	24	1 0
		26 χ Sagittarii	6	22 17	11 54	273	310	23 22	12 59	135	179	1 5
	Sept	5 α Arietis †	4½	19 9	8 7	283	238	20 0	8 58	117	68	0 51
		8 139 Tauri	5½	0 55	13 41	280	222	2 1	14 47	91	31	1 6
	Oct.	9 ω Geminor.	6	3 27	16 8	284	225	4 38	17 19	64	10	1 12
19 B.A.C. 5347 †		5	19 51	7 55	226	267	20 40	8 43	132	179	0 49	
28 ι Piscium		5	18 38	6 6	321	271	19 41	7 9	100	54	1 3	
3 9 Tauri		6	20 14	7 22	271	223	21 5	8 13	125	74	0 52	
3 b Pleiadum		4½	0 21	11 28	331	273	1 20	12 28	74	20	0 59	
3 d Pleiadum		5	0 54	12 1	260	203	2 3	13 11	143	95	1 10	
3 p Pleiadum		7½	1 33	12 40	281	228	2 58	14 5	120	92	1 25	
3 γ Tauri		3½	1 38	12 45	276	224	3 2	14 9	125	100	1 24	
3 f Pleiadum		4½	3 4	14 11	220	196	3 40	14 47	174	173	0 35	
3 h Pleiadum		5½	2 51	13 58	249	217	4 3	15 10	145	162	1 12	
Nov.	5 125 Tauri	6	2 1	13 1	252	192	3 12	14 11	121	64	1 11	
	8 δ Cancri	6	2 35	13 22	245	192	3 34	14 21	89	34	0 59	
	10 43 Leonis	6	4 15	14 54	192	141	4 47	15 26	122	70	0 32	
	26 45 Piscium †	6	6 21	15 57	298	350	7 19	15 55	105	154	0 58	
	14 A Ophiuchi †	5	21 24	5 47	338	22	21 56	6 19	38	86	0 32	
	19 ι Capricor.	5½	21 13	5 17	338	331	22 28	6 31	94	106	1 15	
Dec.	19 B.A.C. 7620 †	6	2 24	10 26	301	348	3 26	11 28	118	169	1 2	
	30 B.A.C. 2238 †	6	23 15	6 35	264	218	0 7	7 27	93	42	0 52	
	2 α Cancri	6	6 21	13 32	226	179	7 37	14 47	82	51	1 15	
	2 α Cancri	6	6 24	13 34	287	240	7 22	14 32	20	344	0 58	
	4 34 Sextantis	6	7 28	14 31	213	169	8 34	15 36	82	47	1 6	
	17 δ Aquarii	4½	1 9	7 21	255	294	1 56	8 8	177	220	0 47	



**OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT  
WASHINGTON, D. C., DURING THE YEAR 1860.**

Date.	Star's Name.	Magnitude.	IMMERSSION.				EMERSION.				Duration of Occultation.
			Washington		Angle from		Washington		Angle from		
			Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	
Dec. 20	45 Piscium	6	h. m.	h. m.	°	°	h. m.	h. m.	°	°	h. m.
24	b Pleiadum	4½	23 30	8 31	287	270	0 53	6 54	150	162	1 22
24	d Pleiadum	5	3 40	9 25	299	302	5 7	10 52	88	134	1 27
24	e Pleiadum	5	4 41	10 25	242	280	5 49	11 33	138	193	1 8
24	γ Tauri	3½	5 22	11 6	268	318	6 44	12 28	107	165	1 22
24	f Pleiadum	4½	6 29	12 14	245	302	7 35	13 20	125	183	1 6
24	h Pleiadum	5½	6 26	12 11	264	321	7 42	13 26	105	163	1 15
27	B.A.C. 2238	6	11 12	16 43	272	330	12 7	17 39	51	106	0 55
31	B.A.C. 3529	6	3 55	9 12	241	190	4 51	10 8	73	21	0 56

**NOTES.**

\* Whole occultation below the horizon of Washington.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.

The *Angles of Position*, for the points of contact, are for *direct vision*, and are reckoned from the Moon's *North Point* and from its *Vertex* towards the West. For *inverted image*, add  $180^\circ$  to the angles given.



# JUPITER'S SATELLITES, 1860. 425

WASHINGTON MEAN TIME.

JANUARY.

		d.	h.	m.	s.			d.	h.	m.	s.
I. Shadow	Egress	1	1	5		II. Transit	Ingress	9	4	12	
I. Transit	Egress	1	1	19		II. Shadow	Egress W.	9	6	56	
IV. Eclipse	Disapp.	1	2	30	59.2	II. Transit	Egress W.	9	7	0	
IV. Occult.	Reapp. W.	1	8	25		IV. Shadow	Ingress W.	9	10	33	
I. Eclipse	Disapp.	1	19	57	41.8	IV. Transit	Ingress W.	9	10	41	
I. Occult.	Reapp.	1	22	27		IV. Shadow	Egress W.	9	14	13	
II. Shadow	Ingress	2	1	34		IV. Transit	Egress W.	9	14	30	
II. Transit	Ingress	2	2	0		III. Shadow	Ingress W.	9	17	38	
II. Shadow	Egress	2	4	21		III. Transit	Ingress W.	9	17	41	
II. Transit	Egress	2	4	48		I. Shadow	Ingress	9	19	9	
III. Shadow	Ingress W.	2	13	39		I. Transit	Ingress	9	19	10	
III. Transit	Ingress W.	2	14	26		III. Shadow	Egress	9	21	3	
III. Shadow	Egress W.	2	17	3		III. Transit	Egress	9	21	8	
I. Shadow	Ingress W.	2	17	15		I. Shadow	Egress	9	21	28	
I. Transit	Ingress W.	2	17	26		I. Transit	Egress	9	21	29	
III. Transit	Egress W.	2	17	53		I. Occult.	Disapp. W.	10	16	17	
I. Shadow	Egress	2	19	34		I. Occult.	Reapp.	10	18	36	
I. Transit	Egress	2	19	45		II. Occult.	Disapp.	10	23	12	
I. Eclipse	Disapp. W.	3	14	26	13.2	II. Occult.	Reapp.	11	2	0	
I. Occult.	Reapp. W.	3	16	53		I. Transit	Ingress W.	11	13	36	
II. Eclipse	Disapp.	3	20	39	28.8	I. Shadow	Ingress W.	11	13	38	
II. Occult.	Reapp.	3	23	46		I. Transit	Egress W.	11	15	55	
I. Shadow	Ingress W.	4	11	43		I. Shadow	Egress W.	11	15	57	
I. Transit	Ingress W.	4	11	52		I. Occult.	Disapp. W.	12	10	43	
I. Shadow	Egress W.	4	14	2		I. Eclipse	Reapp. W.	12	13	2	50.4
I. Transit	Egress W.	4	14	11		II. Transit	Ingress W.	12	17	18	
I. Eclipse	Disapp. W.	5	8	54	41.8	II. Shadow	Ingress W.	12	17	28	
I. Occult.	Reapp. W.	5	11	18		II. Transit	Egress	12	20	7	
II. Shadow	Ingress W.	5	14	51		II. Shadow	Egress	12	20	14	
II. Transit	Ingress W.	5	15	6		III. Occult.	Disapp. W.	13	7	23	
II. Shadow	Egress W.	5	17	39		I. Transit	Ingress W.	13	8	2	
II. Transit	Egress W.	5	17	54		I. Shadow	Ingress W.	13	8	7	
III. Eclipse	Disapp.	6	3	46	21.0	I. Transit	Egress W.	13	10	21	
I. Shadow	Ingress W.	6	6	12		I. Shadow	Egress W.	13	10	26	
I. Transit	Ingress W.	6	6	18		III. Eclipse	Reapp. W.	13	11	2	15.6
III. Occult.	Reapp. W.	6	7	34		I. Occult.	Reapp.	14	5	9	
I. Shadow	Egress W.	6	8	31		I. Eclipse	Disapp. W.	14	7	31	25.6
I. Transit	Egress W.	6	8	37		II. Occult.	Disapp. W.	14	12	19	
I. Eclipse	Disapp.	7	3	23	12.9	II. Eclipse	Reapp. W.	14	15	17	40.6
I. Occult.	Reapp.	7	5	44		I. Transit	Ingress	15	2	28	
II. Eclipse	Disapp. W.	7	9	57	21.1	I. Shadow	Ingress	15	2	35	
II. Occult.	Reapp. W.	7	12	53		I. Transit	Egress	15	4	47	
I. Shadow	Ingress	8	0	41		I. Shadow	Egress	15	4	54	
I. Transit	Ingress	8	0	44		I. Occult.	Disapp.	15	23	35	
I. Shadow	Egress	8	3	0		I. Eclipse	Reapp.	16	1	59	58.3
I. Transit	Egress	8	3	3		II. Transit	Ingress W.	16	6	25	
I. Occult.	Disapp.	8	21	51		II. Shadow	Ingress W.	16	6	43	
I. Occult.	Reapp.	9	0	10		II. Transit	Egress W.	16	9	13	
II. Shadow	Ingress	9	4	8		II. Shadow	Egress W.	16	9	32	



# 426 JUPITER'S SATELLITES, 1860.

## WASHINGTON MEAN TIME.

### JANUARY.

			d.	h.	m.	s.				d.	h.	m.	s.
I.	Transit	Ingress	16	20	54		III.	Shadow	Egress	24	5	2	
III.	Transit	Ingress	16	20	56		I.	Occult.	Disapp.	24	19	45	
I.	Shadow	Ingress	16	21	4		I.	Eclipse	Reapp.	24	22	23	5.9
III.	Shadow	Ingress	16	21	37		II.	Occult.	Disapp.	25	3	42	
I.	Transit	Egress	16	23	13		II.	Eclipse	Reapp. W.	25	7	13	1.1
I.	Shadow	Egress	16	23	23		I.	Transit	Ingress W.	25	17	4	
III.	Transit	Egress	17	0	23		I.	Shadow	Ingress W.	25	17	27	
III.	Shadow	Egress	17	1	3		I.	Transit	Egress	25	19	23	
I.	Occult.	Disapp. W.	17	18	1		I.	Shadow	Egress	25	19	46	
IV.	Occult.	Disapp.	17	18	38		IV.	Transit	Ingress	26	0	49	
I.	Eclipse	Reapp.	17	20	28	37.2	IV.	Shadow	Ingress	26	4	39	
IV.	Eclipse	Reapp.	18	0	10	1.4	IV.	Transit	Egress	26	4	37	
II.	Occult.	Disapp.	18	1	26		IV.	Shadow	Egress W.	26	8	20	
II.	Eclipse	Reapp.	18	4	36	22.5	I.	Occult.	Disapp. W.	26	14	11	
I.	Transit	Ingress W.	18	15	20		I.	Eclipse	Reapp. W.	26	16	51	42.3
I.	Shadow	Ingress W.	18	15	33		II.	Transit	Ingress	26	21	46	
I.	Transit	Egress W.	18	17	39		II.	Shadow	Ingress	26	22	36	
I.	Transit	Egress W.	18	17	52		II.	Transit	Egress	27	0	34	
I.	Occult.	Disapp. W.	19	12	27		II.	Shadow	Egress	27	1	25	
I.	Eclipse	Reapp. W.	19	14	57	12.0	I.	Transit	Ingress W.	27	11	30	
II.	Transit	Ingress	19	19	32		I.	Shadow	Ingress W.	27	11	55	
II.	Shadow	Ingress	19	20	1		I.	Transit	Egress W.	27	13	49	
II.	Transit	Egress	19	22	20		III.	Occult.	Disapp. W.	27	13	56	
II.	Shadow	Egress	19	22	49		I.	Shadow	Egress W.	27	14	14	
I.	Transit	Ingress W.	20	9	46		III.	Eclipse	Reapp.	27	19	2	8.7
I.	Shadow	Ingress W.	20	10	1		I.	Occult.	Disapp. W.	28	8	37	
I.	Transit	Egress W.	20	12	5		I.	Eclipse	Reapp. W.	28	11	20	22.3
I.	Shadow	Egress W.	20	12	20		II.	Occult.	Disapp. W.	28	16	50	
I.	Occult.	Disapp. W.	21	6	53		II.	Eclipse	Reapp.	28	20	31	1.3
I.	Eclipse	Reapp. W.	21	9	25	49.5	I.	Transit	Ingress W.	29	5	56	
II.	Occult.	Disapp. W.	21	14	34		I.	Shadow	Ingress W.	29	6	24	
II.	Eclipse	Reapp.	21	17	54	22.2	I.	Transit	Egress W.	29	8	15	
I.	Transit	Ingress	22	4	12		I.	Shadow	Egress W.	29	8	43	
I.	Shadow	Ingress	22	4	30		I.	Occult.	Disapp.	30	3	3	
I.	Transit	Egress W.	22	6	31		I.	Eclipse	Reapp. W.	30	5	49	0.3
I.	Shadow	Egress W.	22	6	49		II.	Transit	Ingress W.	30	10	54	
I.	Occult.	Disapp.	23	1	19		II.	Shadow	Ingress W.	30	11	54	
I.	Eclipse	Reapp.	23	8	54	25.0	II.	Transit	Egress W.	30	13	42	
II.	Transit	Ingress W.	23	8	39		II.	Shadow	Egress W.	30	14	43	
II.	Shadow	Ingress W.	23	9	18		I.	Transit	Ingress	31	0	22	
II.	Transit	Egress W.	23	11	27		I.	Shadow	Ingress	31	0	53	
II.	Shadow	Egress W.	23	12	7		I.	Transit	Egress	31	2	41	
I.	Transit	Ingress	23	22	38		I.	Shadow	Egress	31	3	12	
I.	Shadow	Ingress	23	22	58		III.	Transit	Ingress	31	3	32	
III.	Transit	Ingress	24	0	13		III.	Shadow	Ingress W.	31	5	35	
I.	Transit	Egress	24	0	57		III.	Transit	Egress W.	31	6	57	
I.	Shadow	Egress	24	1	17		III.	Shadow	Egress W.	31	9	2	
III.	Shadow	Ingress	24	1	36		I.	Occult.	Disapp.	31	21	29	
III.	Transit	Egress	24	3	39								



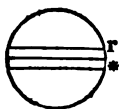
# JUPITER'S SATELLITES, 1860. 427

WASHINGTON MEAN TIME.

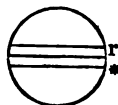
JANUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

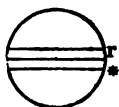
I.



III.



II.



IV.



FEBRUARY.

		d.	h.	m.	s.			d.	h.	m.	s.
I.	Eclipse	Reapp.	1	0	17	43.8	I.	Shadow	Egress	W.	5 10 38
II.	Occult.	Disapp. W.	1	5	58	I.	Occult.	Disapp.			6 4 48
II.	Eclipse	Reapp. W.	1	9	49	37.3	I.	Eclipse	Reapp. W.		6 7 43 44.3
I.	Transit	Ingress	1	18	48		II.	Transit	Ingress	W.	6 13 11
I.	Shadow	Ingress	1	19	21		II.	Shadow	Ingress	W.	6 14 30
I.	Transit	Egress	1	21	7		II.	Transit	Egress	W.	6 15 59
I.	Shadow	Egress	1	21	40		II.	Shadow	Egress		6 17 19
I.	Occult.	Disapp. W.	2	15	55		I.	Transit	Ingress		7 2 7
I.	Eclipse	Reapp.	2	18	46	22.5	I.	Shadow	Ingress		7 2 47
II.	Transit	Ingress	3	0	2		I.	Transit	Egress		7 4 26
II.	Shadow	Ingress	3	1	12		I.	Shadow	Egress		7 5 6
II.	Transit	Egress	3	2	50		III.	Transit	Ingress	W.	7 6 53
II.	Shadow	Egress	3	4	0		III.	Shadow	Ingress	W.	7 9 35
IV.	Occult.	Disapp. W.	3	8	56		III.	Transit	Egress	W.	7 10 19
IV.	Occult.	Reapp. W.	3	12	44		III.	Shadow	Egress	W.	7 13 3
I.	Transit	Ingress	3	13	14		I.	Occult.	Disapp.		7 23 14
I.	Shadow	Ingress	3	13	50		I.	Eclipse	Reapp.		8 2 12 29.9
IV.	Eclipse	Disapp. W.	3	14	34	29.7	II.	Occult.	Disapp. W.		8 8 16
I.	Transit	Egress	3	15	33		II.	Eclipse	Reapp. W.		8 12 26 10.2
I.	Shadow	Egress	3	16	9		I.	Transit	Ingress		8 20 33
III.	Occult.	Disapp.	3	17	16		I.	Shadow	Ingress		8 21 16
IV.	Eclipse	Reapp.	3	18	19	14.5	I.	Transit	Egress		8 22 52
III.	Eclipse	Reapp.	3	23	1	52.6	I.	Shadow	Egress		8 23 35
I.	Occult.	Disapp. W.	4	10	22		I.	Occult.	Disapp.		9 17 40
I.	Eclipse	Reapp. W.	4	13	15	4.9	I.	Eclipse	Reapp.		9 20 41 10.8
II.	Occult.	Disapp.	4	19	7		II.	Transit	Ingress		10 2 20
II.	Eclipse	Reapp.	4	23	7	38.6	II.	Shadow	Ingress		10 3 48
I.	Transit	Ingress	5	7	41		II.	Transit	Egress		10 5 8
I.	Shadow	Ingress	5	8	19		II.	Shadow	Egress	W.	10 6 37
I.	Transit	Egress	5	10	0		I.	Transit	Ingress	W.	10 15 0



# 428 JUPITER'S SATELLITES, 1860.

## WASHINGTON MEAN TIME.

### FEBRUARY.

			d.	h.	m.	s.				d.	h.	m.	s.
I.	Shadow	Ingress	W.	10	15	45		III.	Occult.	Disapp.	18	0	5
I.	Transit	Egress		10	17	19		III.	Occult.	Reapp.	18	3	31
I.	Shadow	Egress		10	18	4		III.	Eclipse	Disapp.	18	3	42 10.6
III.	Occult.	Disapp.		10	20	38		III.	Eclipse	Reapp. W.	18	7	1 55.6
III.	Eclipse	Reapp.		11	3	1 41.5		I.	Occult.	Disapp. W.	18	13	55
I.	Occult.	Disapp. W.		11	12	7		I.	Eclipse	Reapp.	18	17	4 53.8
I.	Eclipse	Reapp. W.		11	15	9 55.5		II.	Occult.	Disapp.	18	23	46
IV.	Transit	Ingress W.		11	15	24		II.	Eclipse	Reapp.	19	4	20 40.6
IV.	Transit	Egress		11	19	12		I.	Transit	Ingress W.	19	11	15
II.	Occult.	Disapp.		11	21	26		I.	Shadow	Ingress W.	19	12	9
IV.	Shadow	Ingress		11	22	32		I.	Transit	Egress W.	19	13	34
II.	Eclipse	Reapp.		12	1	44 11.6		I.	Shadow	Egress W.	19	14	28
IV.	Shadow	Egress		12	2	27		IV.	Occult.	Disapp.	19	23	53
I.	Transit	Ingress W.		12	9	27		IV.	Occult.	Reapp.	20	3	41
I.	Shadow	Ingress W.		12	10	13		I.	Occult.	Disapp. W.	20	8	22
I.	Transit	Egress W.		12	11	46		IV.	Eclipse	Disapp. W.	20	8	37 27.9
I.	Shadow	Egress W.		12	12	32		I.	Eclipse	Reapp. W.	20	11	33 37.0
I.	Occult.	Disapp. W.		13	6	34		IV.	Eclipse	Reapp. W.	20	12	28 47.1
I.	Eclipse	Reapp. W.		13	9	38 36.9		II.	Transit	Ingress	20	17	51
II.	Transit	Ingress W.		13	15	30		II.	Shadow	Ingress	20	19	42
II.	Shadow	Ingress		13	17	6		II.	Transit	Egress	20	20	39
II.	Transit	Egress		13	18	18		II.	Shadow	Egress	20	22	31
II.	Shadow	Egress		13	19	55		I.	Transit	Ingress	21	5	42
I.	Transit	Ingress		14	3	54		I.	Shadow	Ingress W.	21	6	37
I.	Shadow	Ingress		14	4	42		I.	Transit	Egress W.	21	8	1
I.	Transit	Egress W.		14	6	13		I.	Shadow	Egress W.	21	8	56
I.	Shadow	Egress W.		14	7	1		III.	Transit	Ingress W.	21	13	48
III.	Transit	Ingress W.		14	10	19		III.	Transit	Egress	21	17	14
III.	Shadow	Ingress W.		14	13	35		III.	Shadow	Ingress	21	17	35
III.	Transit	Egress W.		14	13	44		III.	Shadow	Egress	21	21	3
III.	Shadow	Egress		14	17	3		I.	Occult.	Disapp.	22	2	49
I.	Occult.	Disapp.		15	1	1		I.	Eclipse	Reapp. W.	22	6	2 26.5
I.	Eclipse	Reapp.		15	4	7 24.4		II.	Occult.	Disapp. W.	22	12	57
II.	Occult.	Disapp. W.		15	10	36		II.	Eclipse	Reapp.	22	17	39 3.5
II.	Eclipse	Reapp. W.		15	15	2 39.1		I.	Transit	Ingress	23	0	9
I.	Transit	Ingress		15	22	21		I.	Shadow	Ingress	23	1	6
I.	Shadow	Ingress		15	23	11		I.	Transit	Egress	23	2	28
I.	Transit	Egress		16	0	40		I.	Shadow	Egress	23	3	25
I.	Shadow	Egress		16	1	30		I.	Occult.	Disapp.	23	21	16
I.	Occult.	Disapp.		16	19	28		I.	Eclipse	Reapp.	24	0	31 11.0
I.	Eclipse	Reapp.		16	22	36 7.3		II.	Transit	Ingress W.	24	7	2
II.	Transit	Ingress		17	4	40		II.	Shadow	Ingress W.	24	9	0
II.	Shadow	Ingress W.		17	6	24		II.	Transit	Egress W.	24	9	50
II.	Transit	Egress W.		17	7	28		II.	Shadow	Egress W.	24	11	49
II.	Shadow	Egress W.		17	9	13		I.	Transit	Ingress	24	18	36
I.	Transit	Ingress		17	16	43		I.	Shadow	Ingress	24	19	35
I.	Shadow	Ingress		17	17	40		I.	Transit	Egress	24	20	55
I.	Transit	Egress		17	19	7		I.	Shadow	Egress	24	21	54
I.	Shadow	Egress		17	19	59		III.	Occult.	Disapp.	25	3	37



# JUPITER'S SATELLITES, 1860. 429

## WASHINGTON MEAN TIME.

### FEBRUARY.

			d.	h.	m.	s.				d.	h.	m.	s.
III. Occult.	Reapp. W.		25	7	3		IV. Transit	Ingress W.		28	6	47	
III. Eclipse	Disapp. W.		25	7	41	52.6	I. Transit	Ingress W.		28	7	30	
III. Eclipse	Reapp. W.		25	11	2	16.2	I. Shadow	Ingress W.		28	8	32	
I. Occult.	Disapp.		25	15	43		I. Transit	Egress W.		28	9	49	
I. Eclipse	Reapp.		25	18	59	59.4	IV. Transit	Egress W.		28	10	36	
II. Occult.	Disapp.		26	2	9		I. Shadow	Egress W.		28	10	51	
II. Eclipse	Reapp. W.		26	6	57	4.3	IV. Shadow	Ingress		28	16	33	
I. Transit	Ingress W.		26	13	3		III. Transit	Ingress		28	17	21	
I. Shadow	Ingress W.		26	14	4		IV. Shadow	Egress		28	20	34	
I. Transit	Egress W.		26	15	22		III. Transit	Egress		28	20	47	
I. Shadow	Egress		26	16	23		III. Shadow	Ingress		28	21	34	
I. Occult.	Disapp. W.		27	10	10		III. Shadow	Egress		29	1	3	
I. Eclipse	Reapp. W.		27	13	28	44.0	I. Occult.	Disapp.		29	4	37	
II. Transit	Ingress		27	20	14		I. Eclipse	Reapp. W.		29	7	57	35.1
II. Shadow	Ingress		27	22	18		II. Occult.	Disapp.		29	15	21	
II. Transit	Egress		27	23	3		II. Eclipse	Reapp.		29	20	15	22.5
II. Shadow	Egress		28	1	8								

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.



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III.



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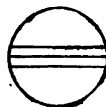
II.



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IV.



d

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### MARCH.

			d.	h.	m.	s.				d.	h.	m.	s.
I. Transit	Ingress		1	1	57		I. Shadow	Ingress		2	21	30	
I. Shadow	Ingress		1	3	1		I. Transit	Egress		2	22	43	
I. Transit	Egress		1	4	16		I. Shadow	Egress		2	23	49	
I. Shadow	Egress		1	5	20		III. Occult.	Disapp. W.		3	7	14	
I. Occult.	Disapp.		1	23	5		III. Occult.	Reapp. W.		3	10	40	
I. Eclipse	Reapp.		2	2	26	21.1	III. Eclipse	Disapp. W.		3	11	42	17.2
II. Transit	Ingress W.		2	9	27		III. Eclipse	Reapp.		3	15	3	18.4
II. Shadow	Ingress W.		2	11	36		I. Occult.	Disapp.		3	17	32	
II. Transit	Egress W.		2	12	15		I. Eclipse	Reapp.		3	20	55	11.3
II. Shadow	Egress W.		2	14	26		II. Occult.	Disapp.		4	4	34	
I. Transit	Ingress		2	20	24		II. Eclipse	Reapp. W.		4	9	33	20.2



# 430 JUPITER'S SATELLITES, 1860.

## WASHINGTON MEAN TIME.

### MARCH.

		d.	h.	m.	s.			d.	h.	m.	s.
I.	Transit	Ingress	4	14	51	I.	Shadow	Ingress	11	17	54
I.	Shadow	Ingress	4	15	58	I.	Transit	Egress	11	19	2
I.	Transit	Egress	4	17	10	I.	Shadow	Egress	11	20	13
I.	Shadow	Egress	4	18	17	I.	Occult.	Disapp. W.	12	13	51
I.	Occult.	Disapp. W.	5	12	0	I.	Eclipse	Reapp.	12	17	19 15.0
I.	Eclipse	Reapp.	5	15	23 56.9	II.	Transit	Ingress	13	1	10
II.	Transit	Ingress	5	22	40	II.	Shadow	Ingress	13	3	32
II.	Shadow	Ingress	6	0	55	II.	Transit	Egress	13	3	58
II.	Transit	Egress	6	1	29	II.	Shadow	Egress W.	13	6	22
II.	Shadow	Egress	6	3	45	I.	Transit	Ingress W.	13	11	11
I.	Transit	Ingress W.	6	9	19	I.	Shadow	Ingress W.	13	12	22
I.	Shadow	Ingress W.	6	10	27	I.	Transit	Egress W.	13	13	30
I.	Transit	Egress W.	6	11	38	I.	Shadow	Egress	13	14	41
I.	Shadow	Egress W.	6	12	46	III.	Transit	Ingress	14	0	43
III.	Transit	Ingress	6	21	0	III.	Transit	Egress	14	4	9
III.	Transit	Egress	7	0	26	III.	Shadow	Ingress	14	5	33
III.	Shadow	Ingress	7	1	33	I.	Occult.	Disapp. W.	14	8	19
III.	Shadow	Egress	7	5	3	III.	Shadow	Egress W.	14	9	4
I.	Occult.	Disapp. W.	7	6	28	I.	Eclipse	Reapp. W.	14	11	48 8.7
I.	Eclipse	Reapp. W.	7	9	52 49.4	II.	Occult.	Disapp.	14	20	16
IV.	Occult.	Disapp.	7	15	46	II.	Eclipse	Reapp.	15	1	27 42.5
II.	Occult.	Disapp.	7	17	48	I.	Transit	Ingress	15	5	39
IV.	Occult.	Reapp.	7	19	36	I.	Shadow	Ingress W.	15	6	51
II.	Eclipse	Reapp.	7	22	51 35.3	I.	Transit	Egress W.	15	7	58
IV.	Eclipse	Disapp.	8	2	40 35.6	I.	Shadow	Egress W.	15	9	10
I.	Transit	Ingress	8	3	47	IV.	Transit	Ingress	15	23	9
I.	Shadow	Ingress	8	4	56	I.	Occult.	Disapp.	16	2	47
I.	Transit	Egress	8	6	6	IV.	Transit	Egress	16	2	59
IV.	Eclipse	Reapp. W.	8	6	38 2.8	I.	Eclipse	Reapp.	16	6	16 57.1
I.	Shadow	Egress W.	8	7	15	IV.	Shadow	Ingress W.	16	10	34
I.	Occult.	Disapp.	9	0	55	II.	Transit	Ingress	16	14	25
I.	Eclipse	Reapp.	9	4	21 36.7	IV.	Shadow	Egress	16	14	43
II.	Transit	Ingress W.	9	11	54	II.	Shadow	Ingress	16	16	50
II.	Shadow	Ingress W.	9	14	13	II.	Transit	Egress	16	17	13
II.	Transit	Egress W.	9	14	43	II.	Shadow	Egress	16	19	40
II.	Shadow	Egress	9	17	3	I.	Transit	Ingress	17	0	7
I.	Transit	Ingress	9	22	15	I.	Shadow	Ingress	17	1	20
I.	Shadow	Ingress	9	23	25	I.	Transit	Egress	17	2	26
I.	Transit	Egress	10	0	34	I.	Shadow	Egress	17	3	39
I.	Shadow	Egress	10	1	44	III.	Occult.	Disapp.	17	14	41
III.	Occult.	Disapp. W.	10	10	55	III.	Occult.	Reapp.	17	18	7
III.	Occult.	Reapp. W.	10	14	21	III.	Eclipse	Disapp.	17	19	42 13.5
III.	Eclipse	Disapp.	10	15	42 11.5	I.	Occult.	Disapp.	17	21	15
III.	Eclipse	Reapp.	10	19	3 49.5	III.	Eclipse	Reapp.	17	23	4 27.3
I.	Occult.	Disapp.	10	19	23	I.	Eclipse	Reapp.	18	0	45 49.6
I.	Eclipse	Reapp.	10	22	50 28.3	II.	Occult.	Disapp. W.	18	9	31
II.	Occult.	Disapp. W.	11	7	2	II.	Eclipse	Reapp.	18	14	45 37.6
II.	Eclipse	Reapp. W.	11	12	9 34.5	I.	Transit	Ingress	18	18	35
I.	Transit	Ingress	11	16	43	I.	Shadow	Ingress	18	19	49



# JUPITER'S SATELLITES, 1860. 431

## WASHINGTON MEAN TIME.

### MARCH.

		d.	h.	m.	s.			d.	h.	m.	s.
I.	Transit	Egress	18	20	54	I.	Eclipse	Reapp.	25	2	41 14.4
I.	Shadow	Egress	18	22	8	III.	Eclipse	Reapp.	25	3	4 41.8
I.	Occult.	Disapp.	19	15	43	II.	Occult.	Disapp. W.	25	12	3
I.	Eclipse	Reapp.	19	19	14 37.1	II.	Eclipse	Reapp.	25	17	21 34.0
II.	Transit	Ingress	20	3	41	I.	Transit	Ingress	25	20	27
II.	Shadow	Ingress	20	6	9	I.	Shadow	Ingress	25	21	44
II.	Transit	Egress W.	20	6	29	I.	Transit	Egress	25	22	46
II.	Shadow	Egress W.	20	8	59	I.	Shadow	Egress	26	0	3
I.	Transit	Ingress W.	20	13	3	I.	Occult.	Disapp.	26	17	36
I.	Shadow	Ingress	20	14	18	I.	Eclipse	Reapp.	26	21	10 2.4
I.	Transit	Egress	20	15	22	II.	Transit	Ingress	27	6	14
I.	Shadow	Egress	20	16	37	II.	Shadow	Ingress W.	27	8	46
III.	Transit	Ingress	21	4	31	II.	Transit	Egress W.	27	9	3
III.	Transit	Egress W.	21	7	57	II.	Shadow	Egress W.	27	11	37
III.	Shadow	Ingress W.	21	9	33	I.	Transit	Ingress	27	14	56
I.	Occult.	Disapp. W.	21	10	11	I.	Shadow	Ingress	27	16	31
III.	Shadow	Egress W.	21	13	4	I.	Transit	Egress	27	17	15
I.	Eclipse	Reapp.	21	13	43 31.7	I.	Shadow	Egress	27	18	32
II.	Occult.	Disapp.	21	22	47	III.	Transit	Ingress W.	28	8	24
II.	Eclipse	Reapp.	22	4	3 40.3	III.	Transit	Egress W.	28	11	51
I.	Transit	Ingress W.	22	7	31	I.	Occult.	Disapp. W.	28	12	5
I.	Shadow	Ingress W.	22	8	47	III.	Shadow	Ingress	28	13	33
I.	Transit	Egress W.	22	9	50	I.	Eclipse	Reapp.	28	15	38 57.6
I.	Shadow	Egress W.	22	11	6	III.	Shadow	Egress	28	17	5
I.	Occult.	Disapp.	23	4	39	II.	Occult.	Disapp.	29	1	19
I.	Eclipse	Reapp. W.	23	8	12 20.8	II.	Eclipse	Reapp.	29	6	39 31.6
II.	Transit	Ingress	23	16	57	I.	Transit	Ingress W.	29	9	25
II.	Shadow	Ingress	23	19	27	I.	Shadow	Ingress W.	29	10	42
II.	Transit	Egress	23	19	46	I.	Transit	Egress W.	29	11	44
II.	Shadow	Egress	23	22	18	I.	Shadow	Egress W.	29	13	1
I.	Transit	Ingress	24	1	59	I.	Occult.	Disapp.	30	6	33
I.	Shadow	Ingress	24	3	15	I.	Eclipse	Reapp. W.	30	10	7 47.4
I.	Transit	Egress	24	4	18	II.	Transit	Ingress	30	19	32
I.	Shadow	Egress	24	5	34	II.	Shadow	Ingress	30	22	4
IV.	Occult.	Disapp. W.	24	8	41	II.	Transit	Egress	30	22	20
IV.	Occult.	Reapp. W.	24	12	31	II.	Shadow	Egress	31	0	55
III.	Occult.	Disapp.	24	18	31	I.	Transit	Ingress	31	3	53
IV.	Eclipse	Disapp.	24	20	44 12.2	I.	Shadow	Ingress	31	5	10
III.	Occult.	Reapp.	24	21	58	I.	Transit	Egress	31	6	12
I.	Occult.	Disapp.	24	23	7	I.	Shadow	Egress W.	31	7	29
III.	Eclipse	Disapp.	24	23	41 52.8	III.	Occult.	Disapp.	31	22	26
IV.	Eclipse	Reapp.	25	0	47 21.4						




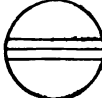


# 432 JUPITER'S SATELLITES, 1860.

## WASHINGTON MEAN TIME.

### MARCH.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		r *
III.		d *      r *
II.		r *
IV.		d *      r *

### APRIL.

			d.	h.	m.	s.				d.	h.	m.	s.
I.	Occult.	Disapp.	1	1	1		II.	Eclipse	Reapp. W.	5	9	15	14.9
III.	Occult.	Reapp.	1	1	53		I.	Transit	Ingress W.	5	11	19	
III.	Eclipse	Disapp.	1	3	41	32.6	I.	Shadow	Ingress W.	5	12	36	
I.	Eclipse	Reapp.	1	4	36	41.7	I.	Transit	Egress	5	13	38	
III.	Eclipse	Reapp. W.	1	7	4	55.8	I.	Shadow	Egress	5	14	55	
II.	Occult.	Disapp.	1	14	36		I.	Occult.	Disapp. W.	6	8	28	
IV.	Transit	Ingress	1	16	30		I.	Eclipse	Reapp. W.	6	12	3	15.8
II.	Eclipse	Reapp.	1	19	57	22.4	II.	Transit	Ingress	6	22	9	
IV.	Transit	Egress	1	20	22		II.	Shadow	Ingress	7	0	42	
I.	Transit	Ingress	1	23	21		II.	Transit	Egress	7	0	57	
I.	Shadow	Ingress	1	23	39		II.	Shadow	Egress	7	3	33	
I.	Transit	Egress	2	0	40		I.	Transit	Ingress	7	5	48	
I.	Shadow	Egress	2	1	58		I.	Shadow	Ingress W.	7	7	5	
IV.	Shadow	Ingress	2	4	36		I.	Transit	Egress W.	7	8	7	
IV.	Shadow	Egress W.	2	8	49		I.	Shadow	Egress W.	7	9	24	
II.	Transit	Ingress W.	3	8	50		III.	Occult.	Disapp.	8	2	25	
II.	Shadow	Ingress W.	3	11	23		I.	Occult.	Disapp.	8	2	57	
II.	Transit	Egress W.	3	11	39		III.	Occult.	Reapp.	8	5	52	
II.	Shadow	Egress	3	14	14		I.	Eclipse	Reapp.	8	6	32	10.6
I.	Transit	Ingress	3	16	50		III.	Eclipse	Reapp. W.	8	11	5	31.2
I.	Shadow	Ingress	3	18	8		II.	Occult.	Disapp.	8	17	12	
I.	Transit	Egress	3	19	9		II.	Eclipse	Reapp.	8	22	33	2.7
I.	Shadow	Egress	3	20	27		I.	Transit	Ingress	9	0	17	
III.	Transit	Ingress W.	4	12	21		I.	Shadow	Ingress	9	1	34	
I.	Occult.	Disapp.	4	13	59		I.	Transit	Egress	9	2	36	
III.	Transit	Egress	4	15	48		I.	Shadow	Egress	9	3	53	
III.	Shadow	Ingress	4	17	33		I.	Occult.	Disapp.	9	21	26	
I.	Eclipse	Reapp.	4	17	34	25.8	I.	Eclipse	Reapp.	10	1	0	59.2
III.	Shadow	Egress	4	21	5		IV.	Occult.	Disapp.	10	2	32	
II.	Occult.	Disapp.	5	8	54		IV.	Occult.	Reapp.	10	6	26	



# JUPITER'S SATELLITES, 1860. 433

WASHINGTON MEAN TIME.

APRIL.

			d.	h.	m.	s.			d.	h.	m.	s.	
II.	Transit	Ingress	W.	10	11	28	I.	Transit	Ingress	17	20	42	
II.	Shadow	Ingress		10	14	1	I.	Shadow	Ingress	17	21	58	
II.	Transit	Egress		10	14	17	I.	Transit	Egress	17	23	1	
IV.	Eclipse	Disapp.		10	14	47 57.3	I.	Shadow	Egress	18	0	17	
II.	Shadow	Egress		10	16	52	IV.	Transit	Ingress	W.	18	10	43
I.	Transit	Ingress		10	18	46	IV.	Transit	Egress		18	14	40
IV.	Eclipse	Reapp.		10	18	56 23.7	I.	Occult.	Disapp.		18	17	52
I.	Shadow	Ingress		10	20	3	III.	Transit	Ingress		18	20	27
I.	Transit	Egress		10	21	5	I.	Eclipse	Reapp.		18	21	25 25.0
I.	Shadow	Egress		10	22	22	IV.	Shadow	Ingress		18	22	37
I.	Occult.	Disapp.		11	15	55	III.	Transit	Egress		18	23	54
III.	Transit	Ingress		11	16	22	III.	Shadow	Ingress		19	1	32
I.	Eclipse	Reapp.		11	19	29 55.2	IV.	Shadow	Egress		19	2	55
III.	Transit	Egress		11	19	49	III.	Shadow	Egress		19	5	5
III.	Shadow	Ingress		11	21	33	I.	Occult.	Disapp.		20	12	21
III.	Shadow	Egress		12	1	5	I.	Eclipse	Reapp.		20	15	54 15.3
II.	Occult.	Disapp.		12	6	30	II.	Transit	Ingress		21	3	28
II.	Eclipse	Reapp.	W.	12	11	50 50.1	II.	Shadow	Ingress		21	5	57
I.	Transit	Ingress		12	13	15	II.	Transit	Egress		21	6	17
I.	Shadow	Ingress		12	14	32	II.	Shadow	Egress	W.	21	8	48
I.	Transit	Egress		12	15	34	I.	Transit	Ingress	W.	21	9	40
I.	Shadow	Egress		12	16	51	I.	Shadow	Ingress	W.	21	10	56
I.	Occult.	Disapp.	W.	13	10	24	I.	Transit	Egress		21	11	59
I.	Eclipse	Reapp.		13	13	58 45.3	I.	Shadow	Egress		21	13	15
II.	Transit	Ingress		14	0	48	I.	Occult.	Disapp.		22	6	51
II.	Shadow	Ingress		14	3	19	I.	Eclipse	Reapp.	W.	22	10	23 10.5
II.	Transit	Egress		14	3	37	III.	Occult.	Disapp.	W.	22	10	36
II.	Shadow	Egress		14	6	10	III.	Occult.	Reapp.		22	14	4
I.	Transit	Ingress	W.	14	7	44	III.	Eclipse	Disapp.		22	15	42 15.5
I.	Shadow	Ingress	W.	14	9	0	III.	Eclipse	Reapp.		22	19	7 16.3
I.	Transit	Egress	W.	14	10	3	II.	Occult.	Disapp.		22	22	28
I.	Shadow	Egress	W.	14	11	19	II.	Eclipse	Reapp.		23	3	48 58.6
I.	Occult.	Disapp.		15	4	53	I.	Transit	Ingress		23	4	9
III.	Occult.	Disapp.		15	6	28	I.	Shadow	Ingress		23	5	24
I.	Eclipse	Reapp.	W.	15	8	27 40.4	I.	Transit	Egress		23	6	28
III.	Occult.	Reapp.	W.	15	9	56	I.	Shadow	Egress	W.	23	7	44
III.	Eclipse	Disapp.	W.	15	11	41 36.7	I.	Occult.	Disapp.		24	1	20
III.	Eclipse	Reapp.		15	15	6 5.9	I.	Eclipse	Reapp.		24	4	51 58.8
II.	Occult.	Disapp.		15	19	49	II.	Transit	Ingress		24	16	49
I.	Transit	Ingress		16	2	13	II.	Shadow	Ingress		24	19	16
I.	Shadow	Ingress		16	3	29	II.	Transit	Egress		24	19	38
I.	Transit	Egress		16	4	32	II.	Shadow	Egress		24	22	7
I.	Shadow	Egress		16	5	48	I.	Transit	Ingress		24	22	38
I.	Occult.	Disapp.		16	23	22	I.	Shadow	Ingress		24	23	53
I.	Eclipse	Reapp.		17	2	56 29.0	I.	Transit	Egress		25	0	57
II.	Transit	Ingress		17	14	8	I.	Shadow	Egress		25	2	12
II.	Shadow	Ingress		17	16	38	I.	Occult.	Disapp.		25	19	49
II.	Transit	Egress		17	16	57	I.	Eclipse	Reapp.		25	23	20 54.7
II.	Shadow	Egress		17	19	29	III.	Transit	Ingress		26	0	33



# 434 JUPITER'S SATELLITES, 1860.

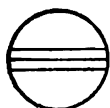
## WASHINGTON MEAN TIME.

### APRIL.

			d.	h.	m.	s.				d.	h.	m.	s.
III.	Transit	Egress	26	4	2		II.	Shadow	Egress W.	28	11	26	
III.	Shadow	Ingress	26	5	32		I.	Transit	Ingress	28	11	37	
III.	Shadow	Egress W.	26	9	5		I.	Shadow	Ingress	28	12	50	
II.	Occult.	Disapp.	26	11	48		I.	Transit	Egress	28	13	56	
II.	Eclipse	Reapp.	26	17	1	36.8	I.	Shadow	Egress	28	15	10	
I.	Transit	Ingress	26	17	7		I.	Occult.	Disapp. W.	29	8	49	
I.	Shadow	Ingress	26	18	21		I.	Eclipse	Reapp.	29	12	18	33.9
I.	Transit	Egress	26	19	26		IV.	Occult.	Disapp.	29	14	44	
I.	Shadow	Egress	26	20	41		IV.	Occult.	Reapp.	29	18	13	
IV.	Occult.	Disapp.	26	21	12		IV.	Eclipse	Disapp.	29	19	42	17.7
IV.	Occult.	Reapp.	27	1	11		IV.	Eclipse	Reapp.	29	23	7	49.3
IV.	Eclipse	Disapp. W.	27	8	51	19.1	II.	Occult.	Disapp.	30	1	8	
IV.	Eclipse	Reapp.	27	13	4	40.3	I.	Transit	Ingress	30	6	7	
I.	Occult.	Disapp.	27	14	19		II.	Eclipse	Reapp.	30	6	19	12.4
I.	Eclipse	Reapp.	27	17	49	44.9	I.	Shadow	Ingress	30	7	19	
II.	Transit	Ingress	28	6	10		I.	Transit	Egress W.	30	8	26	
II.	Shadow	Ingress W.	28	8	34		I.	Shadow	Egress W.	30	9	39	
II.	Transit	Egress W.	28	8	59								

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

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III.



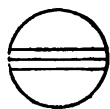
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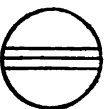
II.



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IV.



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### MAY.

			d.	h.	m.	s.				d.	h.	m.	s.
I.	Occult.	Disapp.	1	3	18		I.	Occult.	Disapp.	2	21	48	
I.	Eclipse	Reapp.	1	6	47	27.9	I.	Eclipse	Reapp.	3	1	16	23.4
II.	Transit	Ingress	1	19	33		III.	Transit	Ingress	3	4	45	
II.	Shadow	Ingress	1	21	53		III.	Transit	Egress W.	3	8	14	
II.	Transit	Egress	1	22	22		III.	Shadow	Ingress W.	3	9	31	
I.	Transit	Ingress	2	0	36		III.	Shadow	Egress	3	13	5	
II.	Shadow	Egress	2	0	45		II.	Occult.	Disapp.	3	14	29	
I.	Shadow	Ingress	2	1	47		I.	Transit	Ingress	3	19	6	
I.	Transit	Egress	2	2	55		II.	Eclipse	Reapp.	3	19	36	48.5
I.	Shadow	Egress	2	4	7		I.	Shadow	Ingress	3	20	16	



# JUPITER'S SATELLITES, 1860. 435

## WASHINGTON MEAN TIME.

### MAY.

		d.	h.	m.	s.			d.	h.	m.	s.
I.	Transit	Egress	3	21	25	I.	Shadow	Egress	11	0	31
I.	Shadow	Egress	3	23	36	I.	Occult.	Disapp.	11	18	17
I.	Occult.	Disapp.	4	16	18	I.	Eclipse	Reapp.	11	21	40 39.5
I.	Eclipse	Reapp.	4	19	45 19.2	II.	Transit	Ingress	12	11	40
IV.	Transit	Ingress	5	5	42	II.	Shadow	Ingress	12	13	49
II.	Transit	Ingress W.	5	8	54	II.	Transit	Egress	12	14	29
IV.	Transit	Egress W.	5	9	43	I.	Transit	Ingress	12	15	34
II.	Shadow	Ingress	5	11	12	I.	Shadow	Ingress	12	16	39
II.	Transit	Egress	5	11	44	II.	Shadow	Egress	12	16	41
I.	Transit	Ingress	5	13	35	I.	Transit	Egress	12	17	53
II.	Shadow	Egress	5	14	4	I.	Shadow	Egress	12	18	59
I.	Shadow	Ingress	5	14	45	I.	Occult.	Disapp.	13	12	46
I.	Transit	Egress	5	15	54	I.	Eclipse	Reapp.	13	16	9 33.8
IV.	Shadow	Ingress	5	16	39	IV.	Occult.	Disapp.	13	16	32
I.	Shadow	Egress	5	17	5	IV.	Occult.	Reapp.	13	20	36
IV.	Shadow	Egress	5	21	2	III.	Occult.	Disapp.	13	23	14
I.	Occult.	Disapp. W.	6	10	47	III.	Occult.	Reapp.	14	2	44
I.	Eclipse	Reapp.	6	14	14 7.7	IV.	Eclipse	Disapp.	14	2	54 44.8
III.	Occult.	Disapp.	6	18	59	III.	Eclipse	Disapp.	14	3	41 57.6
III.	Occult.	Reapp.	6	22	28	II.	Occult.	Disapp.	14	6	32
III.	Eclipse	Disapp.	6	23	42 20.7	III.	Eclipse	Reapp.	14	7	8 28.0
III.	Eclipse	Reapp.	7	3	8 22.1	IV.	Eclipse	Reapp.	14	7	12 39.4
II.	Occult.	Disapp.	7	3	50	I.	Transit	Ingress W.	14	10	4
I.	Transit	Ingress W.	7	8	5	I.	Shadow	Ingress	14	11	8
II.	Eclipse	Reapp. W.	7	8	54 22.4	II.	Eclipse	Reapp.	14	11	29 23.1
I.	Shadow	Ingress W.	7	9	13	I.	Transit	Egress	14	12	23
I.	Transit	Egress W.	7	10	24	I.	Shadow	Egress	14	13	28
I.	Shadow	Egress	7	11	33	I.	Occult.	Disapp.	15	7	16
I.	Occult.	Disapp.	8	5	17	I.	Eclipse	Reapp.	15	10	38 20.4
I.	Eclipse	Reapp. W.	8	8	42 55.1	II.	Transit	Ingress	16	1	3
II.	Transit	Ingress	8	22	17	II.	Shadow	Ingress	16	3	9
II.	Shadow	Ingress	9	0	31	II.	Transit	Egress	16	3	53
II.	Transit	Egress	9	1	7	I.	Transit	Ingress	16	4	33
I.	Transit	Ingress	9	2	34	I.	Shadow	Ingress	16	5	37
II.	Shadow	Egress	9	3	23	II.	Shadow	Egress	16	6	1
I.	Shadow	Ingress	9	3	42	I.	Transit	Egress	16	6	52
I.	Transit	Egress	9	4	53	I.	Shadow	Egress	16	7	57
I.	Shadow	Egress	9	6	2	I.	Occult.	Disapp.	17	1	46
I.	Occult.	Disapp.	9	23	47	I.	Eclipse	Reapp.	17	5	7 14.8
I.	Eclipse	Reapp.	10	3	11 50.3	III.	Transit	Ingress	17	13	17
III.	Transit	Ingress W.	10	9	0	III.	Transit	Egress	17	16	47
III.	Transit	Egress	10	12	29	III.	Shadow	Ingress	17	17	31
III.	Shadow	Ingress	10	13	31	II.	Occult.	Disapp.	17	19	54
III.	Shadow	Egress	10	17	5	III.	Shadow	Egress	17	21	6
II.	Occult.	Disapp.	10	17	11	I.	Transit	Ingress	17	23	3
I.	Transit	Ingress	10	21	4	I.	Shadow	Ingress	18	0	5
I.	Shadow	Ingress	10	22	11	II.	Eclipse	Reapp.	18	0	46 50.1
II.	Eclipse	Reapp.	10	22	11 52.6	I.	Transit	Egress	18	1	22
I.	Transit	Egress	10	23	23	I.	Shadow	Egress	18	2	25



# 436 JUPITER'S SATELLITES, 1860.

WASHINGTON MEAN TIME.

MAY.

			d.	h.	m.	s.				d.	h.	m.	s.
I.	Occult.	Disapp.	18	20	18		I.	Transit	Egress	25	3	22	
I.	Eclipse	Reapp.	18	23	36	3.2	I.	Shadow	Egress	25	4	20	
II.	Transit	Ingress	19	14	26		I.	Occult.	Disapp.	25	22	16	
II.	Shadow	Ingress	19	16	27		I.	Eclipse	Reapp.	26	1	31	
II.	Transit	Egress	19	17	16		II.	Transit	Ingress	26	17	13	
I.	Transit	Ingress	19	17	33		II.	Shadow	Ingress	26	19	5	
I.	Shadow	Ingress	19	18	34		I.	Transit	Ingress	26	19	32	
II.	Shadow	Egress	19	19	19		II.	Transit	Egress	26	20	3	
I.	Transit	Egress	19	19	52		I.	Shadow	Ingress	26	20	29	
I.	Shadow	Egress	19	20	54		I.	Transit	Egress	26	21	52	
I.	Occult.	Disapp.	20	14	46		II.	Shadow	Egress	26	21	57	
I.	Eclipse	Reapp.	20	18	4	57.0	I.	Shadow	Egress	26	22	9	
III.	Occult.	Disapp.	21	3	32		I.	Occult.	Disapp.	27	16	46	
III.	Occult.	Reapp.	21	7	8		I.	Eclipse	Reapp.	27	20	0	17.2
III.	Eclipse	Disapp.	21	7	41	31.8	III.	Occult.	Disapp.	28	7	52	
II.	Occult.	Disapp. W.	21	9	16		III.	Occult.	Reapp.	28	11	24	
III.	Eclipse	Reapp.	21	11	8	30.0	III.	Eclipse	Disapp.	28	11	41	24.7
I.	Transit	Ingress	21	12	3		II.	Occult.	Disapp.	28	12	1	
I.	Shadow	Ingress	21	13	3		I.	Transit	Ingress	28	14	2	
II.	Eclipse	Reapp.	21	14	4	17.4	I.	Shadow	Ingress	28	14	57	
I.	Transit	Egress	21	14	22		III.	Eclipse	Reapp.	28	15	8	49.9
I.	Shadow	Egress	21	15	23		I.	Transit	Egress	28	16	22	
I.	Occult.	Disapp. W.	22	9	16		II.	Eclipse	Reapp.	28	16	39	5.6
I.	Eclipse	Reapp.	22	12	33	43.1	I.	Shadow	Egress	28	17	14	
II.	Transit	Ingress	23	3	50		I.	Occult.	Disapp.	29	11	16	
II.	Shadow	Ingress	23	5	47		I.	Eclipse	Reapp.	29	14	29	2.2
I.	Transit	Ingress	23	6	33		II.	Transit	Ingress	30	6	38	
II.	Transit	Egress	23	6	40		II.	Shadow	Ingress W.	30	8	24	
I.	Shadow	Ingress	23	7	31		I.	Transit	Ingress W.	30	8	32	
II.	Shadow	Egress W.	23	8	39		I.	Shadow	Ingress W.	30	9	26	
I.	Transit	Egress W.	23	8	52		II.	Transit	Egress W.	30	9	28	
I.	Shadow	Egress W.	23	9	51		I.	Transit	Egress	30	10	52	
I.	Occult.	Disapp.	24	3	46		II.	Shadow	Egress	30	11	17	
I.	Eclipse	Reapp.	24	7	2	36.7	I.	Shadow	Egress	30	11	46	
III.	Transit	Ingress	24	17	35		IV.	Occult.	Disapp.	30	12	23	
III.	Transit	Egress	24	21	6		IV.	Occult.	Reapp.	30	16	34	
III.	Shadow	Ingress	24	21	30		IV.	Eclipse	Disapp.	30	20	57	52.0
II.	Occult.	Disapp.	24	22	38		IV.	Eclipse	Reapp.	31	1	19	58.2
I.	Transit	Ingress	25	1	3		I.	Occult.	Disapp.	31	5	46	
III.	Shadow	Egress	25	1	6		I.	Eclipse	Reapp. W.	31	8	57	54.9
I.	Shadow	Ingress	25	2	0		III.	Transit	Ingress	31	21	56	
II.	Eclipse	Reapp.	25	3	21	41.6							



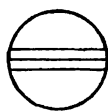
# JUPITER'S SATELLITES, 1860. 437

WASHINGTON MEAN TIME.

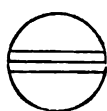
M A Y .

Phases of the Eclipses of the Satellites for an Inverting Telescope.

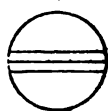
I.



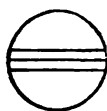
III.



II.



IV.



J U N E .

		d.	h.	m.	s.			d.	h.	m.	s.
II.	Occult.	Disapp.	1	1	23	I.	Eclipse	Reapp.	5	16	24 17.6
III.	Transit	Egress	1	1	27	II.	Transit	Ingress	6	9	26
III.	Shadow	Ingress	1	1	29	I.	Transit	Ingress	6	10	32
I.	Transit	Ingress	1	3	2	II.	Shadow	Ingress	6	11	2
I.	Shadow	Ingress	1	3	55	I.	Shadow	Ingress	6	11	21
III.	Shadow	Egress	1	5	5	II.	Transit	Egress	6	12	17
I.	Transit	Egress	1	5	22	I.	Transit	Egress	6	12	52
II.	Eclipse	Reapp.	1	5	56 27.2	I.	Shadow	Egress	6	13	41
I.	Shadow	Egress	1	6	15	II.	Shadow	Egress	6	13	54
I.	Occult.	Disapp.	2	0	16	I.	Occult.	Disapp.	7	7	47
I.	Eclipse	Reapp.	2	3	26 41.6	I.	Eclipse	Reapp.	7	10	53 9.3
II.	Transit	Ingress	2	20	1	IV.	Transit	Ingress	7	21	15
I.	Transit	Ingress	2	21	32	IV.	Transit	Egress	8	1	30
II.	Shadow	Ingress	2	21	43	III.	Transit	Ingress	8	2	17
I.	Shadow	Ingress	2	22	23	II.	Occult.	Disapp.	8	4	9
II.	Transit	Egress	2	22	52	IV.	Shadow	Ingress	8	4	41
I.	Transit	Egress	2	23	52	I.	Transit	Ingress	8	5	2
II.	Shadow	Egress	3	0	35	III.	Shadow	Ingress	8	5	29
I.	Shadow	Egress	3	0	43	I.	Shadow	Ingress	8	5	49
I.	Occult.	Disapp.	3	18	46	III.	Transit	Egress	8	5	50
I.	Eclipse	Reapp.	3	21	55 33.5	I.	Transit	Egress	8	7	22
III.	Occult.	Disapp.	4	12	14	I.	Shadow	Egress	8	8	9
II.	Occult.	Disapp.	4	14	46	II.	Eclipse	Reapp. W.	8	8	31 7.3
I.	Transit	Ingress	4	16	2	III.	Shadow	Egress W.	8	9	5
I.	Shadow	Ingress	4	16	52	IV.	Shadow	Egress	8	9	12
I.	Transit	Egress	4	18	22	I.	Occult.	Disapp.	9	2	18
III.	Eclipse	Reapp.	4	19	9 3.2	I.	Eclipse	Reapp.	9	5	21 55.0
I.	Shadow	Egress	4	19	12	II.	Transit	Ingress	9	22	50
II.	Eclipse	Reapp.	4	19	13 48.1	I.	Transit	Ingress	9	23	32
I.	Occult.	Disapp.	5	13	17	I.	Shadow	Ingress	10	0	18



# 438 JUPITER'S SATELLITES, 1860.

## WASHINGTON MEAN TIME.

### JUNE.

			d.	h.	m.	s.				d.	h.	m.	s.
II.	Shadow	Ingress	10	0	20		I.	Shadow	Egress	17	4	32	
II.	Transit	Egress	10	1	41		II.	Shadow	Egress	17	5	50	
I.	Transit	Egress	10	1	52		I.	Occult.	Disapp.	17	22	40	
I.	Shadow	Egress	10	2	38		I.	Eclipse	Reapp.	18	1	45	53.6
II.	Shadow	Egress	10	3	13		I.	Transit	Ingress	18	20	3	
I.	Occult.	Disapp.	10	20	48		II.	Occult.	Disapp.	18	20	18	
I.	Eclipse	Reapp.	10	23	50	45.9	I.	Shadow	Ingress	18	20	41	
III.	Occult.	Disapp.	11	16	38		III.	Occult.	Disapp.	18	21	3	
II.	Occult.	Disapp.	11	17	32		I.	Transit	Egress	18	22	23	
I.	Transit	Ingress	11	18	2		I.	Shadow	Egress	18	23	1	
I.	Shadow	Ingress	11	18	46		II.	Eclipse	Reapp.	19	0	22	59.3
I.	Transit	Egress	11	20	22		III.	Eclipse	Reapp.	19	3	9	49.7
I.	Shadow	Egress	11	21	6		I.	Occult.	Disapp.	19	17	20	
II.	Eclipse	Reapp.	11	21	48	25.7	I.	Eclipse	Reapp.	19	20	14	35.2
III.	Eclipse	Reapp.	11	23	9	47.4	I.	Transit	Ingress	20	14	33	
I.	Occult.	Disapp.	12	15	18		II.	Transit	Ingress	20	15	5	
I.	Eclipse	Reapp.	12	18	19	28.9	I.	Shadow	Ingress	20	15	9	
II.	Transit	Ingress	13	12	15		II.	Shadow	Ingress	20	16	17	
I.	Transit	Ingress	13	12	32		I.	Transit	Egress	20	16	53	
I.	Shadow	Ingress	13	13	15		I.	Shadow	Egress	20	17	29	
II.	Shadow	Ingress	13	13	39		II.	Transit	Egress	20	17	56	
I.	Transit	Egress	13	14	52		II.	Shadow	Egress	20	19	10	
II.	Transit	Egress	13	15	6		I.	Occult.	Disapp.	21	11	50	
I.	Shadow	Egress	13	15	35		I.	Eclipse	Reapp.	21	14	43	24.0
II.	Shadow	Egress	13	16	32		I.	Transit	Ingress	22	9	3	
I.	Occult.	Disapp.	14	9	49		I.	Shadow	Ingress	22	9	38	
I.	Eclipse	Reapp.	14	12	48	19.1	II.	Occult.	Disapp.	22	9	41	
III.	Transit	Ingress	15	6	41		III.	Transit	Ingress	22	11	6	
II.	Occult.	Disapp.	15	6	55		I.	Transit	Egress	22	11	23	
I.	Transit	Ingress	15	7	2		I.	Shadow	Egress	22	11	58	
I.	Shadow	Ingress	15	7	43		III.	Shadow	Ingress	22	13	26	
I.	Transit	Egress	15	9	22		II.	Eclipse	Reapp.	22	13	40	15.1
III.	Shadow	Ingress	15	9	27		III.	Transit	Egress	22	14	40	
I.	Shadow	Egress	15	10	3		III.	Shadow	Egress	22	17	4	
III.	Transit	Egress	15	10	14		I.	Occult.	Disapp.	23	6	20	
II.	Eclipse	Reapp.	15	11	5	43.2	I.	Eclipse	Reapp.	23	9	12	7.5
III.	Shadow	Egress	15	13	4		I.	Transit	Ingress	24	3	33	
I.	Occult.	Disapp.	16	4	19		I.	Shadow	Ingress	24	4	7	
I.	Eclipse	Reapp.	16	7	17	3.6	II.	Transit	Ingress	24	4	29	
IV.	Occult.	Disapp.	16	8	36		II.	Shadow	Ingress	24	5	35	
IV.	Occult.	Reapp.	16	12	54		I.	Transit	Egress	24	5	53	
IV.	Eclipse	Disapp.	16	15	0	16.1	I.	Shadow	Egress	24	6	27	
IV.	Eclipse	Reapp.	16	19	26	12.5	II.	Transit	Egress	24	7	21	
I.	Transit	Ingress	17	1	32		II.	Shadow	Egress	24	8	28	
II.	Transit	Ingress	17	1	39		IV.	Transit	Ingress	24	17	34	
I.	Shadow	Ingress	17	2	12		IV.	Transit	Egress	24	21	56	
II.	Shadow	Ingress	17	2	57		IV.	Shadow	Ingress	24	22	43	
I.	Transit	Egress	17	3	52		I.	Occult.	Disapp.	25	0	51	
II.	Transit	Egress	17	4	31		IV.	Shadow	Egress	25	3	17	



# JUPITER'S SATELLITES, 1860. 439

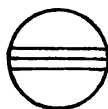
## WASHINGTON MEAN TIME.

### JUNE.

		d.	h.	m.	s.			d.	h.	m.	s.	
I.	Eclipse	Reapp.	25	3	40	56.0	II.	Transit	Egress	27	20	47
I.	Transit	Ingress	25	22	3		II.	Shadow	Egress	27	21	47
I.	Shadow	Ingress	25	22	36		I.	Occult.	Disapp.	28	13	51
II.	Occult.	Disapp.	25	23	5		I.	Eclipse	Reapp.	28	16	38 23.4
I.	Transit	Egress	26	0	23		I.	Transit	Ingress	29	11	4
I.	Shadow	Egress	26	0	56		I.	Shadow	Ingress	29	11	33
III.	Occult.	Disapp.	26	1	29		II.	Occult.	Disapp.	29	12	29
II.	Eclipse	Reapp.	26	2	57	29.1	I.	Transit	Egress	29	13	24
III.	Eclipse	Reapp.	26	7	9	47.3	I.	Shadow	Egress	29	13	53
I.	Occult.	Disapp.	26	19	21		III.	Transit	Ingress	29	15	31
I.	Eclipse	Reapp.	26	22	9	36.1	II.	Eclipse	Reapp.	29	16	14 43.7
I.	Transit	Ingress	27	16	34		III.	Shadow	Ingress	29	17	25
I.	Shadow	Ingress	27	17	5		III.	Transit	Egress	29	19	6
II.	Transit	Ingress	27	17	55		III.	Shadow	Egress	29	21	3
I.	Transit	Egress	27	18	54		I.	Occult.	Disapp.	30	8	22
II.	Shadow	Ingress	27	18	54		I.	Eclipse	Reapp.	30	11	7 5.2
I.	Shadow	Egress	27	19	25							

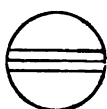
### Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.



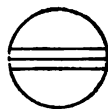
r \*

III.



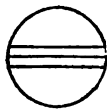
r \*

II.



r \*

IV.



d \*

r \*

The Satellites are not visible from June 30th to September 1st, Jupiter being too near the Sun.

### SEPTEMBER.

		d.	h.	m.				d.	h.	m.	s.	
I.	Shadow	Ingress	1	4	40		I.	Occult.	Reapp.	2	4	54
I.	Transit	Ingress	1	5	12		III.	Shadow	Ingress	2	5	13
I.	Shadow	Egress	1	7	0		III.	Transit	Ingress	2	7	32
I.	Transit	Egress	1	7	32		III.	Shadow	Egress	2	8	54
II.	Eclipse	Disapp.	1	12	35	17.1	III.	Transit	Egress	2	11	13
II.	Occult.	Reapp. W.	1	16	35		I.	Shadow	Ingress	2	23	8
I.	Eclipse	Disapp.	2	2	1	12.3	I.	Transit	Ingress	2	23	42



# 440 JUPITER'S SATELLITES, 1860.

## WASHINGTON MEAN TIME.

### SEPTEMBER.

		d.	h.	m.	s.			d.	h.	m.	s.
I.	Shadow Egress	3	1	28		II.	Transit Ingress	10	11	37	
I.	Transit Egress	3	2	2		II.	Shadow Egress	10	13	9	
II.	Shadow Ingress	3	7	39		II.	Transit Egress	10	14	32	
II.	Transit Ingress	3	8	49		I.	Eclipse Disapp.	10	22	28	37.6
II.	Shadow Egress	3	10	34		I.	Occult. Reapp.	11	1	24	
II.	Transit Egress	3	11	41		I.	Shadow Ingress	11	19	30	
I.	Eclipse Disapp.	3	20	29	44.9	I.	Transit Ingress	11	20	12	
I.	Occult. Reapp.	3	23	24		I.	Shadow Egress W.	11	21	50	
I.	Shadow Ingress	4	17	36		I.	Transit Egress W.	11	22	32	
I.	Transit Ingress	4	18	12		II.	Eclipse Disapp.	12	4	26	56.0
I.	Shadow Egress	4	19	56		II.	Occult. Reapp.	12	8	46	
I.	Transit Egress	4	20	32		I.	Eclipse Disapp. W.	12	16	52	1.6
II.	Eclipse Disapp.	5	1	52	32.8	I.	Occult. Reapp.	12	19	54	
II.	Occult. Reapp.	5	5	59		III.	Eclipse Disapp.	12	23	28	18.4
I.	Eclipse Disapp.	5	14	58	10.5	III.	Occult. Reapp.	13	6	2	
I.	Occult. Reapp.	5	17	54		I.	Shadow Ingress	13	13	58	
III.	Eclipse Disapp.	5	19	29	55.4	I.	Transit Ingress	13	14	42	
III.	Occult. Reapp.	6	1	38		I.	Shadow Egress W.	13	16	18	
I.	Shadow Ingress	6	12	4		I.	Transit Egress W.	13	17	2	
I.	Transit Ingress	6	12	42		II.	Shadow Ingress	13	23	32	
I.	Shadow Egress	6	14	24		II.	Transit Ingress	14	1	1	
I.	Transit Egress	6	15	2		II.	Shadow Egress	14	2	27	
II.	Shadow Ingress	6	20	57		II.	Transit Egress	14	3	56	
II.	Transit Ingress	6	22	14		I.	Eclipse Disapp.	14	11	20	30.0
II.	Shadow Egress	6	23	52		I.	Occult. Reapp.	14	14	24	
H.	Transit Egress	7	1	9		I.	Shadow Ingress	15	8	26	
I.	Eclipse Disapp.	7	9	26	40.7	I.	Transit Ingress	15	9	12	
I.	Occult. Reapp.	7	12	24		I.	Shadow Egress	15	10	46	
I.	Shadow Ingress	8	6	33		I.	Transit Egress	15	11	32	
I.	Transit Ingress	8	7	12		II.	Eclipse Disapp.	15	17	44	0.1
I.	Shadow Egress	8	8	53		II.	Occult. Reapp.	15	22	9	
IV.	Eclipse Disapp.	8	9	6	11.0	I.	Eclipse Disapp.	16	5	48	54.2
I.	Transit Egress	8	9	32		I.	Occult. Reapp.	16	8	54	
IV.	Eclipse Reapp.	8	13	46	10.2	III.	Shadow Ingress	16	13	10	
II.	Eclipse Disapp.	8	15	9	36.8	III.	Transit Ingress W.	16	16	18	
IV.	Occult. Disapp.	8	15	24		IV.	Shadow Ingress W.	16	16	38	
II.	Occult. Reapp.	8	19	22		III.	Shadow Egress W.	16	16	51	
IV.	Occult. Reapp.	8	20	14		III.	Transit Egress	16	20	0	
I.	Eclipse Disapp.	9	3	55	6.7	IV.	Shadow Egress	16	21	27	
I.	Occult. Reapp.	9	6	54		IV.	Transit Ingress	17	0	5	
III.	Shadow Ingress	9	9	12		I.	Shadow Ingress	17	2	55	
III.	Transit Ingress	9	11	56		I.	Transit Ingress	17	3	42	
III.	Shadow Egress	9	12	53		IV.	Transit Egress	17	4	56	
III.	Transit Egress	9	15	37		I.	Shadow Egress	17	5	15	
I.	Shadow Ingress	10	1	1		I.	Transit Egress	17	6	2	
I.	Transit Ingress	10	1	42		II.	Shadow Ingress	17	12	49	
I.	Shadow Egress	10	3	21		II.	Transit Ingress	17	14	24	
I.	Transit Egress	10	4	2		II.	Shadow Egress W.	17	15	44	
II.	Shadow Ingress	10	10	14		II.	Transit Egress W.	17	17	20	



# JUPITER'S SATELLITES, 1860. 441

## WASHINGTON MEAN TIME.

### SEPTEMBER.

			d.	h.	m.	s.				d.	h.	m.	s.
I.	Eclipse	Disapp.	18	0	17	28.7	II.	Shadow	Ingress W.	24	15	24	
I.	Occult.	Reapp.	18	3	24		II.	Transit	Ingress W.	24	17	10	
I.	Shadow	Ingress	18	21	23		II.	Shadow	Egress	24	18	19	
I.	Transit	Ingress	18	22	12		II.	Transit	Egress	24	20	6	
I.	Shadow	Egress	18	23	48		I.	Eclipse	Disapp.	25	2	11	8.2
I.	Transit	Egress	18	0	32		IV.	Eclipse	Disapp.	25	3	5	41.8
II.	Eclipse	Disapp.	19	7	1	28.6	I.	Occult.	Reapp.	25	5	23	
II.	Occult.	Reapp.	19	11	33		IV.	Eclipse	Reapp.	25	7	47	31.8
I.	Eclipse	Disapp.	19	18	45	46.3	IV.	Occult.	Disapp.	25	11	34	
I.	Occult.	Reapp.	19	21	54		IV.	Occult.	Reapp. W.	25	16	27	
III.	Eclipse	Disapp.	20	3	27	10.0	I.	Shadow	Ingress	25	23	17	
III.	Occult.	Reapp.	20	10	25		I.	Transit	Ingress	26	0	11	
I.	Shadow	Ingress W.	20	15	52		I.	Shadow	Egress	26	1	37	
I.	Transit	Ingress W.	20	16	41		I.	Transit	Egress	26	2	31	
I.	Shadow	Egress	20	18	12		II.	Eclipse	Disapp.	26	9	35	56.1
I.	Transit	Egress	20	19	1		II.	Occult.	Reapp.	26	14	19	
II.	Shadow	Ingress	21	2	7		I.	Eclipse	Disapp.	26	20	39	24.5
II.	Transit	Ingress	21	3	48		I.	Occult.	Reapp.	26	23	52	
II.	Shadow	Egress	21	5	2		III.	Eclipse	Disapp.	27	7	25	20.2
II.	Transit	Egress	21	6	43		III.	Eclipse	Reapp.	27	10	57	59.0
I.	Eclipse	Disapp.	21	13	14	13.8	III.	Occult.	Disapp.	27	11	3	
I.	Occult.	Reapp. W.	21	16	23		III.	Occult.	Reapp.	27	14	46	
I.	Shadow	Ingress	22	10	20		I.	Shadow	Ingress	27	17	45	
I.	Transit	Ingress	22	11	11		I.	Transit	Ingress	27	18	41	
I.	Shadow	Egress	22	12	40		I.	Shadow	Egress	27	20	5	
I.	Transit	Egress	22	13	31		I.	Transit	Egress	27	21	1	
II.	Eclipse	Disapp.	22	20	18	28.1	I.	Eclipse	Disapp. W.	28	15	7	49.3
II.	Occult.	Reapp.	23	0	56		I.	Occult.	Reapp.	28	18	22	
I.	Eclipse	Disapp.	23	7	42	35.6	I.	Shadow	Ingress	29	12	14	
I.	Occult.	Reapp.	23	10	53		I.	Transit	Ingress	29	13	10	
III.	Shadow	Ingress W.	23	17	8		I.	Shadow	Egress	29	14	34	
III.	Transit	Ingress	23	20	39		I.	Transit	Egress W.	29	15	30	
III.	Shadow	Egress	23	20	49		II.	Eclipse	Disapp.	29	22	53	1.3
III.	Transit	Egress	24	0	21		II.	Occult.	Reapp.	30	3	41	
I.	Shadow	Ingress	24	4	49		I.	Eclipse	Disapp.	30	9	36	10.7
I.	Transit	Ingress	24	5	41		I.	Occult.	Reapp.	30	12	52	
I.	Shadow	Egress	24	7	9		III.	Shadow	Ingress	30	21	6	
I.	Transit	Egress	24	8	1								



# 442 JUPITER'S SATELLITES, 1860.

WASHINGTON MEAN TIME.

SEPTEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.



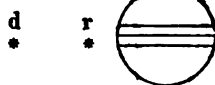
III.



II.



IV.



OCTOBER.

			d.	h.	m.	s.
III.	Shadow	Egress	1	0	47	
III.	Transit	Ingress	1	0	58	
III.	Transit	Egress	1	4	41	
I.	Shadow	Ingress	1	6	42	
I.	Transit	Ingress	1	7	40	
I.	Shadow	Egress	1	9	2	
I.	Transit	Egress	1	10	0	
II.	Shadow	Ingress	1	17	58	
II.	Transit	Ingress	1	19	55	
II.	Shadow	Egress	1	20	54	
II.	Transit	Egress	1	22	51	
I.	Eclipse	Disapp.	2	4	4	86.7
I.	Occult.	Reapp.	2	7	21	
I.	Shadow	Ingress	3	1	11	
I.	Transit	Ingress	3	2	9	
I.	Shadow	Egress	3	3	31	
I.	Transit	Egress	3	4	29	
IV.	Shadow	Ingress	3	10	35	
II.	Eclipse	Disapp.	3	12	10	34.2
IV.	Shadow	Egress W.	3	15	26	
II.	Occult.	Reapp. W.	3	17	4	
IV.	Transit	Ingress	3	20	0	
I.	Eclipse	Disapp.	3	22	32	56.7
IV.	Transit	Egress	4	0	55	
I.	Occult.	Reapp.	4	1	51	
III.	Eclipse	Disapp.	4	11	23	22.7
III.	Eclipse	Reapp. W.	4	14	56	11.5
III.	Occult.	Disapp. W.	4	15	21	
III.	Occult.	Reapp. -	4	19	4	
I.	Shadow	Ingress	4	19	39	

			d.	h.	m.	s.
I.	Transit	Ingress	4	20	49	
I.	Shadow	Egress	4	21	59	
I.	Transit	Egress	4	22	59	
II.	Shadow	Ingress	5	7	16	
II.	Transit	Ingress	5	9	18	
II.	Shadow	Egress	5	10	11	
II.	Transit	Egress	5	12	14	
I.	Eclipse	Disapp. W.	5	17	1	20.1
I.	Occult.	Reapp.	5	20	26	
I.	Shadow	Ingress	6	14	7	
I.	Transit	Ingress W.	6	15	8	
I.	Shadow	Egress W.	6	16	27	
I.	Transit	Egress W.	6	17	29	
II.	Eclipse	Disapp.	7	1	37	40.2
II.	Occult.	Reapp.	7	6	26	
I.	Eclipse	Disapp.	7	11	29	40.2
I.	Occult.	Reapp. W.	7	14	50	
III.	Shadow	Ingress	8	1	4	
III.	Shadow	Egress	8	4	46	
III.	Transit	Ingress	8	5	15	
I.	Shadow	Ingress	8	8	35	
III.	Transit	Egress	8	8	58	
I.	Transit	Ingress	8	9	38	
I.	Shadow	Egress	8	10	55	
I.	Transit	Egress	8	11	58	
II.	Shadow	Ingress	8	20	33	
II.	Transit	Ingress	8	22	39	
II.	Shadow	Egress	8	23	28	
II.	Transit	Egress	9	1	35	
I.	Eclipse	Disapp.	9	5	58	4.9



# JUPITER'S SATELLITES, 1860. 443

## WASHINGTON MEAN TIME.

### OCTOBER.

		d.	h.	m.	s.			d.	h.	m.	s.
I.	Occult.	Reapp.	9	9	19	I.	Shadow	Ingress	17	4	57
I.	Shadow	Ingress	10	3	3	I.	Transit	Ingress	17	6	5
I.	Transit	Ingress	10	4	7	I.	Shadow	Egress	17	7	17
I.	Shadow	Egress	10	5	23	I.	Transit	Egress	17	8	25
I.	Transit	Egress	10	6	27	II.	Eclipse	Disapp. W.	17	17	20 8.1
II.	Eclipse	Disapp. W.	10	14	45 8.1	II.	Occult.	Reapp.	17	22	31
II.	Occult.	Reapp.	10	19	48	I.	Eclipse	Disapp.	18	2	19 45.1
I.	Eclipse	Disapp.	11	0	26 23.5	I.	Occult.	Reapp.	18	5	46
I.	Occult.	Reapp.	11	3	48	III.	Eclipse	Disapp.	18	19	18 36.8
III.	Eclipse	Disapp. W.	11	15	21 1.0	III.	Eclipse	Reapp.	18	22	51 43.0
III.	Eclipse	Reapp.	11	18	53 59.0	I.	Shadow	Ingress	18	23	25
III.	Occult.	Disapp.	11	19	37	III.	Occult.	Disapp.	18	23	50
IV.	Eclipse	Disapp.	11	21	5 4.6	I.	Transit	Ingress	19	0	35
I.	Shadow	Ingress	11	21	32	I.	Shadow	Egress	19	1	45
I.	Transit	Ingress	11	22	37	I.	Transit	Egress	19	2	55
III.	Occult.	Reapp.	11	23	20	III.	Occult.	Reapp.	19	3	33
I.	Shadow	Egress	11	23	52	II.	Shadow	Ingress	19	12	24
I.	Transit	Egress	12	0	57	II.	Transit	Ingress W.	19	14	42
IV.	Eclipse	Reapp.	12	1	48 26.8	II.	Shadow	Egress W.	19	15	19
IV.	Occult.	Disapp.	12	7	19	II.	Transit	Egress W.	19	17	33
II.	Shadow	Ingress	12	9	50	I.	Eclipse	Disapp.	19	20	48 5.3
II.	Transit	Ingress	12	12	1	I.	Occult.	Reapp.	20	0	15
IV.	Occult.	Reapp.	12	12	14	IV.	Shadow	Ingress	20	4	33
II.	Shadow	Egress	12	12	45	IV.	Shadow	Egress	20	9	25
II.	Transit	Egress W.	12	14	57	IV.	Transit	Ingress W.	20	15	27
I.	Eclipse	Disapp.	12	18	54 45.3	I.	Shadow	Ingress W.	20	17	54
I.	Occult.	Reapp.	12	22	18	I.	Transit	Ingress	20	19	4
I.	Shadow	Ingress W.	13	16	0	I.	Shadow	Egress	20	20	14
I.	Transit	Ingress W.	13	17	6	IV.	Transit	Egress	20	20	22
I.	Shadow	Egress	13	18	20	I.	Transit	Egress	20	21	24
I.	Transit	Egress	13	19	26	II.	Eclipse	Disapp.	21	6	37 16.3
II.	Eclipse	Disapp.	14	4	2 25.0	II.	Occult.	Reapp.	21	11	51
II.	Occult.	Reapp.	14	9	9	I.	Eclipse	Disapp. W.	21	15	16 22.9
I.	Eclipse	Disapp. W.	14	13	23 4.0	I.	Occult.	Reapp.	21	18	44
I.	Occult.	Reapp. W.	14	16	47	III.	Shadow	Ingress	22	9	0
III.	Shadow	Ingress	15	5	2	I.	Shadow	Ingress	22	12	22
III.	Shadow	Egress	15	8	44	III.	Shadow	Egress	22	12	42
III.	Transit	Ingress	15	9	30	I.	Transit	Ingress W.	22	13	33
I.	Shadow	Ingress	15	10	29	III.	Transit	Ingress W.	22	13	42
I.	Transit	Ingress	15	11	36	I.	Shadow	Egress W.	22	14	42
I.	Shadow	Egress	15	12	49	I.	Transit	Egress W.	22	15	53
III.	Transit	Egress	15	13	18	III.	Transit	Egress W.	22	17	25
I.	Transit	Egress W.	15	13	56	II.	Shadow	Ingress	23	1	41
II.	Shadow	Ingress	15	23	7	II.	Transit	Ingress	23	4	2
II.	Transit	Ingress	16	1	21	II.	Shadow	Egress	23	4	36
II.	Shadow	Egress	16	2	2	II.	Transit	Egress	23	6	59
II.	Transit	Egress	16	4	18	I.	Eclipse	Disapp.	23	9	44 44.9
I.	Eclipse	Disapp.	16	7	51 27.2	I.	Occult.	Reapp.	23	13	13
I.	Occult.	Reapp.	16	11	16	I.	Shadow	Ingress	24	6	50



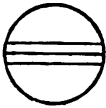
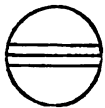
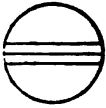
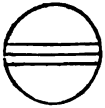
# 444 JUPITER'S SATELLITES, 1860.

WASHINGTON MEAN TIME.

## OCTOBER.

		d.	h.	m.	s.			d.	h.	m.	s.
I.	Transit	Ingress	24	8	2	IV.	Eclipse	Disapp. W.	28	15	3 57.6
I.	Shadow	Egress	24	9	10	I.	Eclipse	Disapp. W.	28	17	9 37.5
I.	Transit	Egress	24	10	22	IV.	Eclipse	Reapp.	28	19	48 33.8
II.	Eclipse	Disapp.	24	19	55 4.7	I.	Occult.	Reapp.	28	20	40
II.	Occult.	Reapp.	25	1	12	IV.	Occult.	Disapp.	29	2	30
I.	Eclipse	Disapp.	25	4	18 1.7	IV.	Occult.	Reapp.	29	7	26
I.	Occult.	Reapp.	25	7	42	III.	Shadow	Ingress	29	12	58
III.	Eclipse	Disapp.	25	23	16 34.7	I.	Shadow	Ingress W.	29	14	16
I.	Shadow	Ingress	26	1	19	I.	Transit	Ingress W.	29	15	29
I.	Transit	Ingress	26	2	31	I.	Shadow	Egress W.	29	16	36
III.	Eclipse	Reapp.	26	2	49 48.3	III.	Shadow	Egress W.	29	16	40
I.	Shadow	Egress	26	3	39	I.	Transit	Egress W.	29	17	49
III.	Occult.	Disapp.	26	4	1	III.	Transit	Ingress W.	29	17	51
I.	Transit	Egress	26	4	51	III.	Transit	Egress	29	21	34
III.	Occult.	Reapp.	26	7	44	II.	Shadow	Ingress	30	4	15
II.	Shadow	Ingress W.	26	14	58	II.	Transit	Ingress	30	6	42
II.	Transit	Ingress W.	26	17	22	II.	Shadow	Egress	30	7	10
II.	Shadow	Egress W.	26	17	53	II.	Transit	Egress	30	9	38
II.	Transit	Egress	26	20	19	I.	Eclipse	Disapp.	30	11	37 58.2
I.	Eclipse	Disapp.	26	22	41 20.8	I.	Occult.	Reapp. W.	30	15	9
I.	Occult.	Reapp.	27	2	11	I.	Shadow	Ingress	31	8	44
I.	Shadow	Ingress	27	19	47	I.	Transit	Ingress	31	9	58
I.	Transit	Ingress	27	21	0	I.	Shadow	Egress	31	11	4
I.	Shadow	Egress	27	22	8	I.	Transit	Egress	31	12	18
I.	Transit	Egress	27	23	20	II.	Eclipse	Disapp.	31	22	30 7.8
II.	Eclipse	Disapp.	28	9	12 13.9	II.	Occult.	Reapp.	32	3	53
II.	Occult.	Reapp. W.	28	14	33						

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.	d *		III.	d *	r *	
II.	d *		IV.	d *	r *	

## NOVEMBER.

I.	Eclipse	Disapp. W.	d.	h.	m.	s.	I.	Shadow	Ingress W.	d.	h.	m.	s.
I.	Occult.	Reapp. W.	1	6	6	14.3	III.	Eclipse	Disapp. W.	2	3	13	
			1	9	38					2	3	14	23.2



# JUPITER'S SATELLITES, 1860. 445

## WASHINGTON MEAN TIME.

### NOVEMBER.

		d.	h.	m.	s.			d.	h.	m.	s.
I.	Transit	Ingress	2	4	26		III.	Eclipse	Reapp.	9	10 46 8.4
I.	Shadow	Egress	2	5	33		II.	Shadow	Ingress	9	20 5
I.	Transit	Egress	2	6	46		II.	Transit	Ingress	9	22 37
III.	Eclipse	Reapp.	2	6	47 43.4		II.	Shadow	Egress	9	23 1
II.	Shadow	Ingress W.	2	17	31		II.	Transit	Egress	10	1 34
II.	Transit	Ingress	2	20	0		I.	Eclipse	Disapp.	10	2 27 40.2
II.	Shadow	Egress	2	20	27		I.	Occult.	Reapp.	10	6 2
II.	Transit	Egress	2	22	56		I.	Shadow	Ingress	10	23 34
I.	Eclipse	Disapp.	3	0	34 32.2		I.	Transit	Ingress	11	0 49
I.	Occult.	Reapp.	3	4	7		I.	Shadow	Egress	11	1 54
I.	Shadow	Ingress	3	21	41		I.	Transit	Egress	11	3 9
I.	Transit	Ingress	3	22	55		II.	Eclipse	Disapp. W.	11	14 22 30.8
I.	Shadow	Egress	4	0	1		II.	Occult.	Reapp.	11	19 50
I.	Transit	Egress	4	1	15		I.	Eclipse	Disapp.	11	20 55 55.3
II.	Eclipse	Disapp.	4	11	47 18.8		I.	Occult.	Reapp.	12	0 30
II.	Occult.	Reapp. W.	4	17	12		I.	Shadow	Ingress W.	12	18 3
I.	Eclipse	Disapp.	4	19	2 47.8		I.	Transit	Ingress	12	19 18
I.	Occult.	Reapp.	4	22	36		I.	Shadow	Egress	12	20 23
I.	Shadow	Ingress W.	5	16	10		III.	Shadow	Ingress	12	20 53
III.	Shadow	Ingress W.	5	16	50		I.	Transit	Egress	12	21 38
I.	Transit	Ingress W.	5	17	23		III.	Shadow	Egress	13	0 36
I.	Shadow	Egress	5	18	30		III.	Transit	Ingress	13	1 58
I.	Transit	Egress	5	19	44		III.	Transit	Egress	13	5 41
III.	Shadow	Egress	5	20	38		II.	Shadow	Ingress	13	9 21
III.	Transit	Ingress	5	21	56		II.	Transit	Ingress	13	11 55
IV.	Shadow	Ingress	5	22	30		II.	Shadow	Egress W.	13	12 17
III.	Transit	Egress	6	1	39		II.	Transit	Egress W.	13	14 51
IV.	Shadow	Egress	6	8	24		I.	Eclipse	Disapp. W.	13	15 24 13.9
II.	Shadow	Ingress	6	6	48		I.	Occult.	Reapp.	13	18 58
II.	Transit	Ingress	6	9	18		IV.	Eclipse	Disapp.	14	9 2 32.0
II.	Shadow	Egress	6	9	44		I.	Shadow	Ingress W.	14	12 31
IV.	Transit	Ingress	6	10	16		I.	Transit	Ingress W.	14	13 46
II.	Transit	Egress	6	12	15		IV.	Eclipse	Reapp. W.	14	13 48 3.8
I.	Eclipse	Disapp. W.	6	13	31 7.5		I.	Shadow	Egress W.	14	14 51
IV.	Transit	Egress W.	6	15	11		I.	Transit	Egress W.	14	16 6
I.	Occult.	Reapp. W.	6	17	4		IV.	Occult.	Disapp.	14	20 59
I.	Shadow	Ingress	7	10	38		IV.	Occult.	Reapp.	15	1 54
I.	Transit	Ingress	7	11	52		II.	Eclipse	Disapp.	15	3 40 35.7
I.	Shadow	Egress W.	7	12	58		II.	Occult.	Reapp.	15	9 9
I.	Transit	Egress W.	7	14	13		I.	Eclipse	Disapp.	15	9 52 29.1
II.	Eclipse	Disapp.	8	1	5 18.4		I.	Occult.	Reapp. W.	15	13 26
II.	Occult.	Reapp.	8	6	32		I.	Shadow	Ingress	16	7 0
I.	Eclipse	Disapp.	8	7	59 23.1		I.	Transit	Ingress	16	8 15
I.	Occult.	Reapp.	8	11	33		I.	Shadow	Egress	16	9 20
I.	Shadow	Ingress	9	5	6		I.	Transit	Egress	16	10 35
I.	Transit	Ingress	9	6	21		III.	Eclipse	Disapp.	16	11 10 22.1
III.	Eclipse	Disapp.	9	7	12 42.6		III.	Eclipse	Reapp. W.	16	14 43 52.7
I.	Shadow	Egress	9	7	26		III.	Occult.	Disapp. W.	16	16 12
I.	Transit	Egress	9	8	41		III.	Occult.	Reapp.	16	19 55



# 446 JUPITER'S SATELLITES, 1860.

## WASHINGTON MEAN TIME.

### NOVEMBER.

			d.	h.	m.	s.				d.	h.	m.	s.
II.	Shadow	Ingress	16	22	38		III.	Occult.	Disapp.	23	20	8	
II.	Transit	Ingress	17	1	12		III.	Occult.	Reapp.	23	23	50	
II.	Shadow	Egress	17	1	34		II.	Shadow	Ingress	24	1	11	
II.	Transit	Egress	17	4	8		II.	Transit	Ingress	24	3	44	
I.	Eclipse	Disapp.	17	4	24	45.6	II.	Shadow	Egress	24	4	7	
I.	Occult.	Reapp.	17	7	54		I.	Eclipse	Disapp.	24	6	13	49.2
I.	Shadow	Ingress	18	1	28		II.	Transit	Egress	24	6	40	
I.	Transit	Ingress	18	2	43		I.	Occult.	Reapp.	24	9	46	
I.	Shadow	Egress	18	3	48		I.	Shadow	Ingress	25	3	22	
I.	Transit	Egress	18	5	3		I.	Transit	Ingress	25	4	36	
II.	Eclipse	Disapp. W.	18	16	57	50.3	I.	Shadow	Egress	25	5	42	
II.	Occult.	Reapp.	18	22	26		I.	Transit	Egress	25	6	56	
I.	Eclipse	Disapp.	18	23	49	0.2	II.	Eclipse	Disapp.	25	19	33	17.1
I.	Occult.	Reapp.	19	2	22		I.	Eclipse	Disapp.	26	0	42	3.5
I.	Shadow	Ingress	19	19	56		II.	Occult.	Reapp.	26	1	0	
I.	Transit	Ingress	19	21	12		I.	Occult.	Reapp.	26	4	14	
I.	Shadow	Egress	19	22	16		I.	Shadow	Ingress	26	21	50	
I.	Transit	Egress	19	23	32		I.	Transit	Ingress	26	23	4	
III.	Shadow	Ingress	20	0	51		I.	Shadow	Egress	27	0	10	
III.	Shadow	Egress	20	4	34		I.	Transit	Egress	27	1	24	
III.	Transit	Ingress	20	5	57		III.	Shadow	Ingress	27	4	43	
III.	Transit	Egress	20	9	39		III.	Shadow	Egress	27	8	32	
II.	Shadow	Ingress W.	20	11	55		III.	Transit	Ingress	27	9	50	
II.	Transit	Ingress W.	20	14	28		III.	Transit	Egress W.	27	13	33	
II.	Shadow	Egress W.	20	14	51		II.	Shadow	Ingress W.	27	14	28	
I.	Eclipse	Disapp. W.	20	17	17	18.3	II.	Transit	Ingress W.	27	16	59	
II.	Transit	Egress W.	20	17	24		II.	Shadow	Egress W.	27	17	24	
I.	Occult.	Reapp.	20	20	50		I.	Eclipse	Disapp.	27	19	10	21.4
I.	Shadow	Ingress W.	21	14	25		II.	Transit	Egress	27	19	56	
I.	Transit	Ingress W.	21	15	40		I.	Occult.	Reapp.	27	22	43	
I.	Shadow	Egress W.	21	16	45		I.	Shadow	Ingress W.	28	16	18	
I.	Transit	Egress W.	21	18	0		I.	Transit	Ingress W.	28	17	32	
II.	Eclipse	Disapp.	22	6	16	0.4	I.	Shadow	Egress W.	28	18	38	
II.	Occult.	Reapp. W.	22	11	44		I.	Transit	Egress	28	19	52	
I.	Eclipse	Disapp. W.	22	11	45	33.2	II.	Eclipse	Disapp.	29	8	51	32.9
I.	Occult.	Reapp. W.	22	15	18		I.	Eclipse	Disapp. W.	29	13	38	36.2
IV.	Shadow	Ingress W.	22	16	27		II.	Occult.	Reapp. W.	29	14	17	
IV.	Shadow	Egress	22	21	22		I.	Occult.	Reapp. W.	29	17	10	
IV.	Transit	Ingress	23	4	17		I.	Shadow	Ingress	30	10	46	
I.	Shadow	Ingress	23	8	53		I.	Transit	Ingress W.	30	12	0	
IV.	Transit	Egress	23	9	12		I.	Shadow	Egress W.	30	13	6	
I.	Transit	Ingress	23	10	8		I.	Transit	Egress W.	30	14	20	
I.	Shadow	Egress	23	11	13		III.	Eclipse	Disapp.	30	19	5	14.6
I.	Transit	Egress W.	23	12	28		III.	Eclipse	Reapp.	30	22	38	52.4
III.	Eclipse	Disapp. W.	23	15	7	57.4	III.	Occult.	Disapp.	30	23	59	
III.	Eclipse	Reapp. W.	23	18	41	32.0							

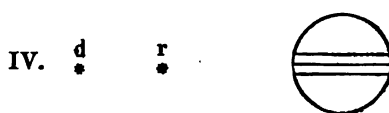
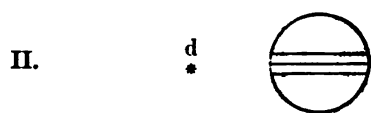
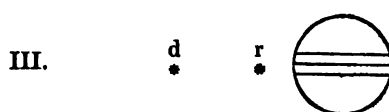
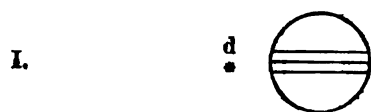


# JUPITER'S SATELLITES, 1860. 447

WASHINGTON MEAN TIME.

NOVEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



DECEMBER.

		d.	h.	m.	s.
IV.	Eclipse	Disapp.	1	3	1 21.0
III.	Occult.	Reapp.	1	3	41
II.	Shadow	Ingress	1	3	45
II.	Transit	Ingress	1	6	14
II.	Shadow	Egress	1	6	41
IV.	Eclipse	Reapp.	1	7	47 30.0
I.	Eclipse	Disapp.	1	8	6 51.9
II.	Transit	Egress	1	9	10
I.	Occult.	Reapp. W.	1	11	38
IV.	Occult.	Disapp. W.	1	14	36
IV.	Occult.	Reapp.	1	19	30
I.	Shadow	Ingress	2	5	15
I.	Transit	Ingress	2	6	28
I.	Shadow	Egress	2	7	35
I.	Transit	Egress	2	8	48
II.	Eclipse	Disapp.	2	22	8 52.2
I.	Eclipse	Disapp.	3	2	35 6.2
II.	Occult.	Reapp.	3	3	32
I.	Occult.	Reapp.	3	6	6
I.	Shadow	Ingress	3	23	43
I.	Transit	Ingress	4	0	56
I.	Shadow	Egress	4	2	8
I.	Transit	Egress	4	3	16
III.	Shadow	Ingress	4	8	48
III.	Shadow	Egress W.	4	12	30
III.	Transit	Ingress W.	4	13	40
II.	Shadow	Ingress W.	4	17	1
III.	Transit	Egress W.	4	17	22
II.	Transit	Ingress	4	19	28
II.	Shadow	Egress	4	19	57

		d.	h.	m.	s.
I.	Eclipse	Disapp.	4	21	3 23.8
II.	Transit	Egress	4	22	25
I.	Occult.	Reapp.	5	0	33
I.	Shadow	Ingress W.	5	18	11
I.	Transit	Ingress	5	19	24
I.	Shadow	Egress	5	20	31
I.	Transit	Egress	5	21	44
II.	Eclipse	Disapp. W.	6	11	27 12.9
I.	Eclipse	Disapp. W.	6	15	31 38.9
II.	Occult.	Reapp. W.	6	16	47
I.	Occult.	Reapp.	6	19	1
I.	Shadow	Ingress W.	7	12	40
I.	Transit	Ingress W.	7	13	52
I.	Shadow	Egress W.	7	15	0
I.	Transit	Egress W.	7	16	12
III.	Eclipse	Disapp.	7	23	2 35.3
III.	Eclipse	Reapp.	8	2	36 15.3
III.	Occult.	Disapp.	8	3	45
II.	Shadow	Ingress	8	6	18
III.	Occult.	Reapp.	8	7	27
II.	Transit	Ingress	8	8	42
II.	Shadow	Egress	8	9	14
I.	Eclipse	Disapp.	8	9	59 54.6
II.	Transit	Egress W.	8	11	38
I.	Occult.	Reapp. W.	8	13	28
I.	Shadow	Ingress	9	7	8
I.	Transit	Ingress	9	8	19
I.	Shadow	Egress	9	9	29
IV.	Shadow	Ingress	9	10	24
I.	Transit	Egress W.	9	10	39



# 448 JUPITER'S SATELLITES, 1860.

## WASHINGTON MEAN TIME.

### DECEMBER.

		d.	h.	m.	s.			d.	h.	m.	s.
IV.	Transit	Ingress	W.	9	15	20	II.	Occult.	Reapp.	17	8 29
IV.	Shadow	Egress		9	21	23	I.	Occult.	Reapp.	17	9 44
II.	Eclipse	Disapp.		10	0 44	34.5	IV.	Eclipse	Disapp.	17	20 59 57.9
IV.	Transit	Egress		10	2	16	IV.	Eclipse	Reapp.	18	1 46 26.7
I.	Eclipse	Disapp.		10	4 28	9.2	I.	Shadow	Ingress	18	3 31
II.	Occult.	Reapp.		10	6	1	I.	Transit	Ingress	18	4 36
I.	Occult.	Reapp.		10	7	56	I.	Shadow	Egress	18	5 51
I.	Shadow	Ingress		11	1	37	I.	Transit	Egress	18	6 56
I.	Transit	Ingress		11	2	47	IV.	Occult.	Disapp.	18	7 13
I.	Shadow	Egress		11	3	57	IV.	Occult.	Reapp. W.	18	12 6
I.	Transit	Egress		11	5	7	III.	Shadow	Ingress W.	18	16 44
III.	Shadow	Ingress W.		11	12	46	III.	Shadow	Egress	18	20 26
III.	Shadow	Egress W.		11	16	28	III.	Transit	Ingress	18	21 5
III.	Transit	Ingress W.		11	17	25	II.	Shadow	Ingress	18	22 7
II.	Shadow	Ingress		11	19	34	II.	Transit	Ingress	19	0 18
III.	Transit	Egress		11	21	7	III.	Transit	Egress	19	0 47
II.	Transit	Ingress		11	21	54	I.	Eclipse	Disapp.	19	0 49 31.4
II.	Shadow	Egress		11	22	30	II.	Shadow	Egress	19	1 4
I.	Eclipse	Disapp.		11	22	56 26.8	II.	Transit	Egress	19	3 14
II.	Transit	Egress		12	0	51	I.	Occult.	Reapp.	19	4 11
I.	Occult.	Reapp.		12	2	23	I.	Shadow	Ingress	19	21 59
I.	Shadow	Ingress		12	20	5	I.	Transit	Ingress	19	23 3
I.	Transit	Ingress		12	21	15	I.	Shadow	Egress	20	0 19
I.	Shadow	Egress		12	22	25	I.	Transit	Egress	20	1 23
I.	Transit	Egress		12	23	35	II.	Eclipse	Disapp. W.	20	16 38 55.9
II.	Eclipse	Disapp. W.		13	14	8' 0.5	I.	Eclipse	Disapp.	20	19 17 47.8
I.	Eclipse	Disapp. W.		13	17	24 42.6	II.	Occult.	Reapp.	20	21 42
II.	Occult.	Reapp.		13	19	16	I.	Occult.	Reapp.	20	22 38
I.	Occult.	Reapp.		13	20	50	I.	Shadow	Ingress W.	21	16 27
I.	Shadow	Ingress W.		14	14	34	I.	Transit	Ingress W.	21	17 30
I.	Transit	Ingress W.		14	15	42	I.	Shadow	Egress	21	18 47
I.	Shadow	Egress W.		14	16	54	I.	Transit	Egress	21	19 50
I.	Transit	Egress W.		14	18	2	III.	Eclipse	Disapp.	22	6 58 9.5
III.	Eclipse	Disapp.		15	3	0 25.0	III.	Eclipse	Reapp. W.	22	10 31 51.7
III.	Eclipse	Reapp.		15	6	34 6.4	III.	Occult.	Disapp. W.	22	11 4
III.	Occult.	Disapp.		15	7	27	II.	Shadow	Ingress W.	22	11 24
II.	Shadow	Ingress		15	8	51	II.	Shadow	Ingress W.	22	13 30
II.	Transit	Ingress W.		15	11	7	I.	Eclipse	Disapp. W.	22	13 46 4.3
III.	Occult.	Reapp. W.		15	11	9	II.	Shadow	Egress W.	22	14 20
II.	Shadow	Egress W.		15	11	47	III.	Occult.	Reapp. W.	22	14 46
I.	Eclipse	Disapp. W.		15	11	52 58.4	II.	Transit	Egress W.	22	16 26
II.	Transit	Egress W.		15	14	3	I.	Occult.	Reapp. W.	22	17 5
I.	Occult.	Reapp. W.		15	15	17	I.	Shadow	Ingress W.	23	10 56
I.	Shadow	Ingress		16	9	2	I.	Transit	Ingress W.	23	11 57
I.	Transit	Ingress		16	10	9	I.	Shadow	Egress W.	23	13 16
I.	Shadow	Egress W.		16	11	22	I.	Transit	Egress W.	23	14 17
I.	Transit	Egress W.		16	12	29	II.	Eclipse	Disapp.	24	5 56 23.6
II.	Eclipse	Disapp.		17	3	20 25.3	I.	Eclipse	Disapp.	24	8 14 20.2
I.	Eclipse	Disapp.		17	6	21 13.6	II.	Occult.	Reapp. W.	24	10 54



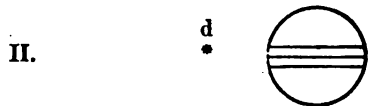
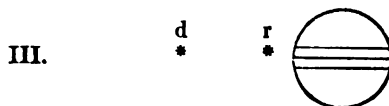
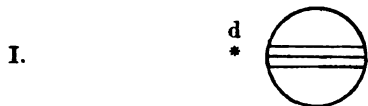
# JUPITER'S SATELLITES, 1860. 449

WASHINGTON MEAN TIME.

DECEMBER.

						d.	h.	m.	s.							d.	h.	m.	s.			
I.	Occult.	Reapp.	W.	24	11	32								II.	Eclipse	Disapp.	27	19	14	58.6		
I.	Shadow	Ingress		25	5	24								I.	Eclipse	Disapp.	27	21	10	56.2		
I.	Transit	Ingress		25	6	24								II.	Occult.	Reapp.	28	0	6			
I.	Shadow	Egress		25	7	44								I.	Occult.	Reapp.	28	0	26			
I.	Transit	Egress		25	8	44								I.	Shadow	Ingress	W.	28	18	21		
III.	Shadow	Ingress		25	20	41								I.	Transit	Ingress		28	19	18		
III.	Shadow	Egress		26	0	24								I.	Shadow	Egress		28	20	41		
III.	Transit	Ingress		26	0	39								I.	Transit	Egress		28	21	38		
II.	Shadow	Ingress		26	0	41								II.	Shadow	Ingress	W.	29	13	57		
II.	Transit	Ingress		26	2	40								I.	Eclipse	Disapp.	W.	29	15	39	13.4	
I.	Eclipse	Disapp.		26	2	42	38.5							II.	Transit	Ingress	W.	29	15	50		
II.	Shadow	Egress		26	3	37								II.	Shadow	Egress	W.	29	16	53		
III.	Transit	Egress		26	4	21								II.	Transit	Egress		29	18	46		
IV.	Shadow	Ingress		26	4	22								I.	Occult.	Reapp.		29	18	52		
II.	Transit	Egress		26	5	36								I.	Shadow	Ingress	W.	30	12	49		
I.	Occult.	Reapp.		26	5	58								I.	Transit	Ingress	W.	30	13	44		
IV.	Shadow	Egress		26	9	18								I.	Shadow	Egress	W.	30	15	10		
IV.	Transit	Ingress	W.	26	13	29								I.	Transit	Egress	W.	30	16	4		
IV.	Transit	Egress	W.	26	18	21								II.	Eclipse	Disapp.		31	8	32	29.4	
I.	Shadow	Ingress		26	23	53								I.	Eclipse	Disapp.	W.	31	10	7	30.4	
I.	Transit	Ingress		27	0	51								II.	Occult.	Reapp.	W.	31	13	16		
I.	Shadow	Egress		27	2	13								I.	Occult.	Reapp.	W.	31	13	18		
I.	Transit	Egress		27	3	11																

Phases of the Eclipses of the Satellites for an Inverting Telescope.





# 450 JUPITER'S SATELLITES, 1860.

WASHINGTON MEAN TIME OF GEOCENTRIC SUPERIOR CONJUNCTION.

## SATELLITE I.

		h. m.		h. m.		h. m.		h. m.			
Jan.	1	21 17.9	March	17	22 24.4	June	2	1 26.3	Oct.	18	4 35.5
	3	15 43.7		19	16 52.5		3	19 56.5		19	23 4.8
	5	10 9.4		21	11 20.8		5	14 26.7		21	17 33.8
	7	4 35.2		23	5 49.1		7	8 56.9		23	12 3.0
	8	23 1.0		25	0 17.5		9	3 27.2		25	6 32.0
	10	17 26.9		26	18 45.8		10	21 57.5		27	1 0.9
	12	11 52.7		28	13 14.4		12	16 27.7		28	19 29.8
	14	6 18.6		30	7 42.9		14	10 58.1		30	13 58.7
	16	0 44.4	April	1	2 11.6		16	5 28.4	Nov.	1	8 27.5
	17	19 10.4		2	20 40.2		17	23 58.8		3	2 56.3
	19	13 36.2		4	15 9.0		19	18 29.1		4	21 24.9
	21	8 2.2		6	9 37.8		21	12 59.5		6	15 53.5
	23	2 28.2		8	4 6.7		23	7 29.9		8	10 22.1
	24	20 54.3		9	22 35.6		25	2 0.3		10	4 50.6
	26	15 20.3		11	17 4.7		26	20 30.6		11	23 19.0
	28	9 46.4		13	11 33.8		28	15 1.0		13	17 47.4
	30	4 12.5		15	6 3.0		30	9 31.4		15	12 15.8
	31	22 38.9		17	0 32.1	Sept.	2	8 43.3		17	6 44.0
Feb.	2	17 5.1		18	19 1.4		3	22 13.5		19	1 12.3
	4	11 31.4		20	13 30.6		5	16 43.5		20	19 40.5
	6	5 57.7		22	8 0.0		7	11 13.6		22	14 8.5
	8	0 24.2		24	2 29.4		9	5 43.6		24	8 36.5
	9	18 50.6		25	20 58.9		11	0 13.6		26	3 4.4
	11	13 17.3		27	15 28.5		12	18 43.5		27	21 32.3
	13	7 43.8		29	9 58.1		14	13 13.5		29	16 0.1
	15	2 10.5	May	1	4 27.6		16	7 43.4	Dec.	1	10 27.8
	16	20 37.2		2	22 57.3		18	2 13.3		3	4 55.4
	18	15 4.1		4	17 26.9		19	20 43.0		4	23 23.0
	20	9 31.0		6	11 56.7		21	15 12.9		6	17 50.6
	22	3 58.1		8	6 26.4		23	9 42.7		8	12 18.0
	23	22 25.1		10	0 56.2		25	4 12.4		10	6 45.4
	25	16 52.3		11	19 26.0		26	22 42.1		12	1 12.3
	27	11 19.5		13	13 55.9		28	17 11.8		13	19 40.8
	29	5 46.9		15	8 25.7		30	11 41.3		15	14 7.2
March	2	0 14.2		17	2 55.7	Oct.	2	6 10.9		17	8 34.2
	3	18 41.8		18	21 25.6		4	0 40.5		19	3 1.3
	5	13 9.3		20	15 55.7		5	19 10.1		20	21 28.3
	7	7 37.0		22	10 25.6		7	13 39.5		22	15 55.2
	9	2 4.6		24	4 55.7		9	8 9.0		24	10 22.0
	10	20 32.5		25	23 25.8		11	2 38.4		26	4 48.8
	12	15 0.3		27	17 56.0		12	21 7.7		27	23 15.5
	14	9 28.2		29	12 26.0		14	15 37.1		29	17 42.1
	16	3 56.2		31	6 56.2		16	10 6.3		31	12 8.7

## SATELLITE II.

		h. m.		h. m.		h. m.		h. m.		
Jan.	3	22 21.8	Jan.	28	18 13.8	Feb.	22	14 21.6	March 18	10 55.4
	7	11 28.6	Feb.	1	7 22.5		26	3 33.0		0 11.1
	11	0 36.2		4	20 30.9		29	16 45.4		13 27.2
	14	13 43.0		8	9 40.3	March 4		5 58.2		2 43.7
	18	2 50.7		11	22 49.7		7	19 11.9	April 1	16 0.8
	21	15 57.9		15	12 0.0		11	8 25.8		5 18.3
	25	5 6.0		19	1 10.4		14	21 40.4		18 36.3



# JUPITER'S SATELLITES. 1860. 451

WASHINGTON MEAN TIME OF GEOCENTRIC SUPERIOR CONJUNCTION.

## SATELLITE II.

April 12	h. m. 7 54.7	June 4	h. m. 16 11.2	Sept. 26	h. m. 12 50.6	Nov. 15	h. m. 7 40.5
15	21 13.5	8	5 34.2	30	2 13.1	18	20 57.7
19	10 32.7	11	18 57.3	Oct. 3	15 25.7	22	10 15.5
22	23 52.4	15	8 20.5	7	4 57.7	25	23 31.7
26	13 12.4	18	21 43.8	10	18 19.7	29	12 48.4
30	2 32.8	22	11 7.3	14	7 41.1	Dec. 3	2 3.6
May 3	15 53.6	26	0 31.0	17	21 2.7	6	15 19.2
7	5 14.6	29	13 54.8	21	10 23.3	10	4 33.1
10	18 35.8	Sept. 1	15 7.2	24	23 44.8	13	17 47.7
14	7 57.5	5	4 31.2	28	13 4.3	17	7 0.5
17	21 19.2	8	17 54.7	Nov. 1	2 24.7	20	20 13.9
21	10 41.2	12	7 18.3	4	15 43.9	24	9 25.6
25	0 3.4	15	20 41.5	8	5 3.5	27	22 37.7
28	13 25.8	19	10 4.9	11	18 21.8	31	11 48.0
June 1	2 48.4	22	23 27.7				

## SATELLITE III.

Jan. 6	h. m. 5 50.4	March 24	h. m. 20 14.5	June 11	h. m. 18 24.9	Oct. 26	h. m. 5 52.1
13	9 5.9	April 1	0 9.3	18	22 50.1	Nov. 2	9 59.3
20	12 21.5	8	4 8.6	26	3 16.3	9	14 3.5
27	15 39.0	15	8 12.1	Sept. 5	23 47.7	16	18 3.4
Feb. 3	18 58.4	22	12 19.9	13	4 11.5	23	21 59.0
10	22 20.9	29	16 28.6	20	8 34.2	Dec. 1	1 49.9
18	1 48.3	May 6	20 43.7	27	12 54.6	8	5 36.1
25	5 19.9	14	0 59.5	Oct. 4	17 12.7	15	9 18.2
March 3	8 56.7	21	5 17.6	11	21 28.4	22	12 55.2
10	12 37.9	28	9 38.1	19	1 41.4	29	16 28.3
17	16 24.0	June 4	14 0.3				

## SATELLITE IV.

Jan. 1	h. m. 6 30.7	March 24	h. m. 10 36.3	June 16	h. m. 10 45.0	Oct. 29	h. m. 4 58.0
17	20 32.7	April 10	4 29.1	Sept. 8	17 49.3	Nov. 14	23 26.5
Feb. 3	10 49.7	26	23 11.4	25	14 0.5	Dec. 1	17 2.7
20	1 47.4	May 13	18 34.3	Oct. 12	9 46.6	18	9 39.5
March 7	17 41.0	30	14 28.5				

Factors by which  $x'$  and  $y'$  in the following Table must be multiplied to obtain the coördinates  $x$  and  $y$  for any time.

$p$  = the inclination of the northern Semiminor Axis of the apparent ellipse to the circle of Declination; + East, — West.

$x$  and  $y$  at the time of the visible phase of every fourth eclipse for the I<sup>st</sup>, of every second eclipse for the II<sup>nd</sup>, and of every eclipse for the III<sup>rd</sup> and IV<sup>th</sup> Satellites.



# 452 JUPITER'S SATELLITES, 1860.

## SATELLITE I.

Date, 1860.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.		Date, 1860.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.	
	Factor for x'.	Factor for y'.	p.	x'.	y'.		Factor for x'.	Factor for y'.	p.	x'.	y'.
Jan. 1	1.224	+0.428	+10 32.0	-26	+3	June 5	0.864	+0.237	+12 7.3	+27	+2
8	1.227	0.432	10 8.0	-23	3	12	0.854	0.223	12 41.1	26	1
16	1.225	0.435	9 43.8	+25	3	19	0.846	0.209	13 15.5	24	1
23	1.219	0.436	9 20.1	28	3	26	0.839	0.195	13 50.1	+22	1
30	1.208	0.435	8 57.8	31	3	Sept. 2	0.840	0.057	18 52.0	-23	0
Feb. 6	1.194	+0.432	+ 8 37.5	+34	+3	9	0.847	+0.042	+19 17.8	-25	+0
13	1.176	0.428	8 20.9	36	3	16	0.856	0.026	19 42.0	26	0
20	1.155	0.422	8 8.1	38	3	23	0.866	+0.010	20 4.7	26	0
27	1.133	0.414	7 59.2	39	3	30	0.878	-0.007	20 25.6	29	0
March 5	1.110	0.405	7 54.3	40	2	Oct. 7	0.891	0.023	20 44.7	31	0
12	1.086	+0.395	+ 7 53.3	+40	+2	14	0.905	-0.040	+21 2.1	-32	+0
19	1.062	0.384	7 56.1	40	2	21	0.921	0.056	21 17.7	34	0
26	1.039	0.373	8 3.6	40	2	28	0.939	0.073	21 31.3	36	+0
April 2	1.016	0.361	8 15.2	39	2	Nov. 4	0.957	0.090	21 43.0	36	-0
9	0.994	0.348	8 30.7	38	2	11	0.977	0.107	21 52.8	37	1
17	0.973	+0.334	+ 8 49.5	+37	+2	19	0.998	-0.123	+22 0.6	-38	-1
24	0.953	0.320	9 11.3	36	2	26	1.020	0.139	22 6.4	38	1
May 1	0.934	0.306	9 35.8	35	2	Dec. 3	1.042	0.154	22 10.3	39	1
8	0.917	0.292	10 2.7	33	2	10	1.064	0.167	22 11.9	38	1
15	0.902	0.278	10 31.9	32	2	17	1.087	0.180	22 11.5	38	1
22	0.888	+0.265	+11 2.7	+30	+2	24	1.109	-0.191	+22 9.1	-37	-1
29	0.875	+0.251	+11 34.4	+29	+2	31	1.129	-0.199	+22 4.5	-36	-1

## SATELLITE II.

Date, 1860.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.		Date, 1860.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.	
	Factor for x'.	Factor for y'.	p.	x'.	y'.		Factor for x'.	Factor for y'.	p.	x'.	y'.
Jan. 3	1.228	+0.512	+10 16.6	-27	+6	June 8	0.860	+0.303	+12 15.9	+32	+4
11	1.228	0.515	9 52.0	+22	6	15	0.851	0.290	12 50.9	30	4
18	1.224	0.516	9 27.4	27	6	22	0.843	0.277	13 26.4	28	3
25	1.215	0.514	9 3.4	33	6	29	0.837	0.264	14 2.1	+25	3
Feb. 1	1.203	0.511	8 41.5	38	6	Sept. 1	0.840	0.148	18 56.7	-27	2
8	1.187	+0.506	+ 8 22.0	+42	+6	8	0.847	+0.135	+19 23.6	-30	+2
15	1.169	0.499	8 6.0	45	6	15	0.856	0.121	19 48.8	32	1
22	1.149	0.491	7 53.6	48	6	22	0.866	0.108	20 12.4	35	1
29	1.127	0.482	7 45.6	50	6	30	0.877	0.094	20 34.2	37	1
March 7	1.103	0.471	7 42.0	51	6	Oct. 7	0.890	0.080	20 54.2	40	1
14	1.079	+0.459	+ 7 42.7	+52	+6	14	0.905	+0.066	+21 12.4	-42	+1
22	1.055	0.447	7 47.8	52	5	21	0.921	0.052	21 28.7	44	1
29	1.031	0.434	7 57.3	52	5	28	0.938	0.038	21 43.0	46	0
April 5	1.008	0.421	8 10.4	51	5	Nov. 4	0.957	0.025	21 55.3	48	0
12	0.986	0.408	8 27.5	49	5	11	0.977	+0.012	22 5.6	49	0
19	0.965	+0.395	+ 8 48.0	+48	+5	18	0.998	-0.001	+22 13.8	-50	+0
26	0.946	0.381	9 11.4	46	5	25	1.020	0.013	22 20.0	51	0
May 3	0.928	0.378	9 37.4	44	4	Dec. 3	1.042	0.024	22 24.1	51	0
10	0.912	0.355	10 5.9	42	4	10	1.064	0.034	22 26.0	51	-0
17	0.897	0.342	10 36.3	40	4	17	1.087	0.043	22 25.7	50	0
25	0.883	+0.329	+11 8.3	+37	+4	24	1.109	-0.050	+22 23.2	-48	-1
June 1	0.871	+0.316	+11 41.6	+35	+4	31	1.129	-0.055	+22 18.6	-46	-1



# JUPITER'S SATELLITES, 1860. 453

## SATELLITE III.

Date, 1860	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.			
	Factor for $x'$ .	Factor for $y'$ .	$p$ .	Disappearance.		Reappearance.	
				$x'$ .	$y'$ .	$x'$ .	$y'$ .
Jan. 6	1.226	+0.440	$+10^{\circ} 5.3$	$+25^u$	$+8^u$	$^u$	$^u$
13	1.226	0.442	9 40.7	..	..	+24	+8
20	1.222	0.442	9 16.4	..	..	33	8
27	1.213	0.440	8 53.2	..	..	41	8
Feb. 3	1.199	0.437	8 32.1	..	..	49	8
10	1.181	+0.432	+8 13.7	..	..	+56	+7
18	1.162	0.426	7 59.0	+22	+7	61	7
25	1.141	0.419	7 48.2	27	7	65	7
March 3	1.118	0.410	7 41.7	31	7	68	7
10	1.094	0.400	7 39.6	34	7	70	7
17	1.069	+0.389	+7 41.9	+36	+7	+71	+7
24	1.045	0.377	7 48.6	37	6	71	6
April 1	1.022	0.365	7 59.5	37	6	71	6
8	0.999	0.353	8 14.1	36	6	70	6
15	0.977	0.340	8 32.4	35	6	68	5
22	0.957	+0.328	+8 53.9	+33	+5	+66	+5
29	0.938	0.315	9 18.2	31	5	63	5
May 6	0.921	0.308	9 45.1	28	5	60	5
14	0.905	0.290	10 14.1	25	5	56	5
21	0.890	0.277	10 44.9	22	5	53	5
28	0.877	+0.265	+11 17.3	+18	+5	+49	+5
June 4	0.865	0.251	11 50.8	..	..	45	4
11	0.855	0.239	12 25.2	..	..	41	4
18	0.847	0.226	13 0.1	..	..	37	4
26	0.840	0.214	13 35.3	..	..	+33	4
Sept. 5	0.850	+0.086	+18 57.0	-37	+1	..	..
13	0.854	0.070	19 22.5	41	1	..	..
20	0.862	0.054	19 46.4	44	1	..	..
27	0.878	0.039	20 8.6	48	1	-17	+1
Oct. 4	0.885	0.024	20 29.0	51	0	20	0
11	0.899	+0.009	+20 47.5	-55	+0	-23	+0
19	0.915	-0.005	21 4.1	59	0	26	0
26	0.933	0.020	21 18.8	62	+0	29	+0
Nov. 2	0.951	0.035	21 31.5	64	-1	31	-1
9	0.971	0.050	21 42.3	66	1	32	1
16	0.991	-0.065	+21 51.0	-68	-1	-33	-1
23	1.013	0.079	21 57.6	69	1	33	1
Dec. 1	1.035	0.092	22 2.1	70	2	33	2
8	1.058	0.105	22 4.5	69	2	32	2
15	1.080	0.116	22 4.7	68	2	30	2
22	1.101	-0.126	+22 2.8	-65	-2	-27	-2
29	1.121	-0.184	+21 58.7	-62	-2	-22	-2



# 454 JUPITER'S SATELLITES, 1860.

## SATELLITE IV.

Date, 1860.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.			
	Factor for $x'$ .	Factor for $y'$ .	$p$ .	Disappearance.		Reappearance.	
				$x'$ .	$y'$ .	$x'$ .	$y'$ .
Jan. 1	1.223	+0.376	+10 13.3	— 37	+18	..	..
17	1.224	0.378	9 16.7	..	..	+ 33	+13
Feb. 3	1.199	0.373	8 24.4	+ 34	13	68	13
20	1.157	0.360	7 47.0	60	12	94	12
March 7	1.103	0.342	7 81.4	75	12	108	12
24	1.047	+0.321	+ 7 89.6	+ 80	+11	+112	+11
April 10	0.993	0.297	8 10.3	78	10	108	10
26	0.945	0.273	9 0.0	69	10	99	10
May 13	0.905	0.248	10 4.3	57	9	87	9
30	0.874	0.224	11 18.6	43	8	72	8
June 16	0.860	+0.204	+12 38.9	+ 28	+ 7	+ 57	+ 7
Sept. 8	0.847	0.073	18 58.1	— 56	2	— 26	2
25	0.870	0.046	19 54.0	72	2	41	2
Oct. 12	0.901	+0.017	20 40.1	87	1	55	1
29	0.940	—0.012	21 15.8	99	+ 0	65	0
Nov. 14	0.986	—0.041	+21 40.6	—107	— 1	— 72	— 1
Dec. 1	1.038	0.068	21 54.1	101	2	73	2
18	1.090	—0.091	+21 55.8	—104	— 3	— 65	— 3

## SATELLITE I.

COORDINATES IN THE MEAN APPARENT ELLIPSE, DESCRIBED BY THE  
SATELLITE, AND FOR THE MEAN DISTANCE OF JUPITER  
FROM THE SUN, FOR THE TIME ( $t$ ) AFTER GEO-  
CENTRIC SUPERIOR CONJUNCTION.

$t$	$x'$	$y'$	$t$	$x'$	$y'$	$t$	$x'$	$y'$
d. h. m.			d. h. m.			d. h. m.		
0 0 0	+ 0.0	+ 6.6	0 5 20	+ 77.5	+ 4.7	0 10 40	+109.1	— 0.1
0 0 20	5.4	6.6	0 5 40	81.2	4.4	0 11 0	109.0	0.4
0 0 40	10.8	6.6	0 6 0	84.7	4.2	0 11 20	108.6	0.7
0 1 0	16.1	6.6	0 6 20	88.0	3.9	0 11 40	107.9	1.0
0 1 20	21.4	6.5	0 6 40	91.1	3.7	0 12 0	106.9	1.3
0 1 40	+ 26.6	+ 6.4	0 7 0	+ 94.0	+ 3.4	0 12 20	+105.7	— 1.7
0 2 0	31.8	6.3	0 7 20	96.6	3.1	0 12 40	104.2	2.0
0 2 20	36.9	6.2	0 7 40	99.0	2.8	0 13 0	102.5	2.3
0 2 40	42.0	6.1	0 8 0	101.1	2.5	0 13 20	100.5	2.6
0 3 0	46.9	6.0	0 8 20	103.0	2.2	0 13 40	98.3	2.9
0 3 20	+ 51.7	+ 5.8	0 8 40	+104.7	+ 1.9	0 14 0	+ 95.8	— 3.2
0 3 40	56.4	5.7	0 9 0	106.1	1.6	0 14 20	93.1	3.5
0 4 0	60.9	5.5	0 9 20	107.3	1.3	0 14 40	90.2	3.7
0 4 20	65.3	5.3	0 9 40	108.1	0.9	0 15 0	87.1	4.0
0 4 40	69.5	5.1	0 10 0	108.7	0.6	0 15 20	83.7	4.3
0 5 0	+ 73.6	+ 4.9	0 10 20	+109.1	+ 0.3	0 15 40	+ 80.1	— 4.5



# JUPITER'S SATELLITES, 1860. 455

## COORDINATES IN THE MEAN APPARENT ELLIPSE.

### SATELLITE I.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h. m.	<i>u</i>	<i>u</i>	d. h. m.	<i>u</i>	<i>u</i>	d. h. m.	<i>u</i>	<i>u</i>
0 16 0	+ 76.4	- 4.7	1 1 40	- 66.6	- 5.2	1 11 0	- 97.6	+ 3.0
0 16 30	72.5	5.0	1 2 0	70.8	5.0	1 11 30	95.1	3.3
0 16 40	68.4	5.2	1 2 20	74.8	4.8	1 11 40	92.3	3.5
0 17 0	64.1	5.4	1 2 40	78.6	4.6	1 12 0	89.3	3.8
0 17 30	59.6	5.5	1 3 0	82.2	4.4	1 12 30	86.1	4.1
0 17 40	+ 55.0	- 5.7	1 3 20	- 85.6	- 4.1	1 12 40	- 82.7	+ 4.3
0 18 0	50.8	5.9	1 3 40	88.9	3.8	1 13 0	79.1	4.6
0 18 30	45.5	6.0	1 4 0	91.9	3.6	1 13 30	75.3	4.8
0 18 40	40.5	6.1	1 4 20	94.7	3.3	1 13 40	71.3	5.0
0 19 0	35.5	6.3	1 4 40	97.3	3.0	1 14 0	67.1	5.2
0 19 30	+ 30.4	- 6.4	1 5 0	- 99.6	- 2.7	1 14 30	- 62.8	+ 5.4
0 19 40	25.2	6.4	1 5 20	101.7	2.4	1 14 40	58.3	5.6
0 20 0	19.9	6.5	1 5 40	103.5	2.1	1 15 0	53.7	5.8
0 20 30	14.6	6.6	1 6 0	105.1	1.8	1 15 30	49.0	5.9
0 20 40	9.2	6.6	1 6 20	106.4	1.5	1 15 40	44.1	6.1
0 21 0	+ 3.8	- 6.6	1 6 40	- 107.5	- 1.2	1 16 0	- 39.1	+ 6.2
0 21 30	- 1.5	6.6	1 7 0	108.3	0.8	1 16 30	34.0	6.3
0 21 40	6.0	6.6	1 7 20	108.8	0.5	1 16 40	28.9	6.4
0 22 0	12.3	6.6	1 7 40	109.1	- 0.2	1 17 0	23.7	6.5
0 22 30	17.6	6.5	1 8 0	109.1	+ 0.1	1 17 30	18.4	6.5
0 22 40	- 22.9	- 6.5	1 8 20	- 108.9	+ 0.5	1 17 40	- 13.0	+ 6.6
0 23 0	- 28.1	6.4	1 8 40	108.4	0.8	1 18 0	7.7	6.6
0 23 30	33.3	6.3	1 9 0	107.6	1.1	1 18 30	- 2.3	6.6
0 23 40	38.4	6.2	1 9 20	106.6	1.4	1 18 40	+ 3.1	6.6
1 0 0	43.4	6.1	1 9 40	105.3	1.8	1 19 0	8.5	6.6
1 0 30	- 48.3	- 5.9	1 10 0	- 103.8	+ 2.1	1 19 30	+ 13.8	+ 6.6
1 0 40	53.1	5.8	1 10 20	102.0	2.4	1 19 40	19.1	6.5
1 1 0	57.7	5.6	1 10 40	- 99.9	+ 2.7	1 20 0	+ 24.4	+ 6.5
1 1 30	- 62.2	- 5.4						

### SATELLITE II.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h. m.	<i>u</i>	<i>u</i>	d. h. m.	<i>u</i>	<i>u</i>	d. h. m.	<i>u</i>	<i>u</i>
0 0 0	+ 0.0	+12.2	0 10 40	+122.9	+ 8.6	0 21 30	+173.8	- 0.0
0 0 40	8.5	12.2	0 11 20	128.8	8.2	0 22 0	173.6	0.6
0 1 20	17.0	12.1	0 12 0	134.4	7.7	0 22 40	172.9	1.2
0 2 0	25.5	12.1	0 12 40	139.6	7.3	0 23 30	171.8	1.8
0 2 40	33.9	12.0	0 13 20	144.5	6.8	1 0 0	170.4	2.4
0 3 30	+ 42.2	+11.8	0 14 0	+149.0	+ 6.3	1 0 40	+168.5	- 3.0
0 4 0	50.5	11.7	0 14 40	153.2	5.7	1 1 30	166.2	3.5
0 4 40	58.6	11.5	0 15 20	157.0	5.2	1 2 0	163.5	4.1
0 5 20	66.5	11.3	0 16 0	160.5	4.7	1 2 40	160.4	4.7
0 6 0	74.3	11.0	0 16 40	163.6	4.1	1 3 30	157.0	5.2
0 6 40	+ 81.9	+10.8	0 17 20	+166.3	+ 3.5	1 4 0	+153.2	- 5.8
0 7 30	89.4	10.5	0 18 0	168.6	3.0	1 4 40	149.0	6.3
0 8 0	96.6	10.1	0 18 40	170.5	2.4	1 5 20	144.4	6.8
0 8 40	103.6	9.8	0 19 20	171.9	1.8	1 6 0	139.5	7.3
0 9 30	110.3	9.4	0 20 0	172.9	1.2	1 6 40	134.2	7.7
0 10 0	+116.7	+ 9.0	0 20 40	+173.6	+ 0.6	1 7 20	+128.6	- 8.2



# 456 JUPITER'S SATELLITES, 1860.

## COORDINATES IN THE MEAN APPARENT ELLIPSE.

### SATELLITE II.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h. m.	"	"	d. h. m.	"	"	d. h. m.	"	"
1 8 0	+122.7	- 8.6	2 3 20	-103.7	- 9.8	2 22 0	-156.9	+ 5.2
1 8 40	116.5	9.0	2 4 0	110.4	9.4	2 22 40	153.0	5.8
1 9 20	110.1	9.4	2 4 40	116.8	9.0	2 23 20	148.8	6.3
1 10 0	103.4	9.8	2 5 20	123.0	8.6	3 0 0	144.2	6.8
1 10 40	96.4	10.1	2 6 0	128.9	8.2	3 0 40	139.3	7.3
1 11 20	+ 89.2	-10.5	2 6 40	-134.5	- 7.7	3 1 20	-134.1	+ 7.8
1 12 0	81.7	10.8	2 7 20	139.7	7.2	3 2 0	128.5	8.2
1 12 40	74.1	11.0	2 8 0	144.6	6.7	3 2 40	122.6	8.6
1 13 20	66.3	11.3	2 8 40	149.1	6.2	3 3 20	116.4	9.0
1 14 0	58.3	11.5	2 9 20	153.3	5.7	3 4 0	109.9	9.4
1 14 40	+ 50.2	-11.7	2 10 0	-157.1	- 5.2	3 4 40	-103.1	+ 9.8
1 15 20	42.0	11.8	2 10 40	160.6	4.6	3 5 20	96.1	10.1
1 16 0	33.7	12.0	2 11 20	163.7	4.1	3 6 0	88.9	10.5
1 16 40	25.3	12.1	2 12 0	166.4	3.5	3 6 40	81.5	10.8
1 17 20	16.8	12.1	2 12 40	168.6	2.9	3 7 20	73.9	11.0
1 18 0	+ 8.3	-12.2	2 13 20	-170.4	- 2.3	3 8 0	- 66.1	+11.3
1 18 40	- 0.2	12.2	2 14 0	171.9	1.8	3 8 40	58.1	11.5
1 19 20	8.8	12.2	2 14 40	173.0	1.2	3 9 20	50.0	11.7
1 20 0	17.3	12.1	2 15 20	173.6	- 0.6	3 10 0	41.8	11.8
1 20 40	25.7	12.1	2 16 0	173.8	+ 0.0	3 10 40	33.5	12.0
1 21 20	- 34.1	-12.0	2 16 40	-173.6	+ 0.6	3 11 20	- 25.1	+12.1
1 22 0	42.4	11.8	2 17 20	172.9	1.2	3 12 0	16.6	12.1
1 22 40	50.6	11.7	2 18 0	171.8	1.8	3 12 40	- 8.1	12.2
1 23 20	58.7	11.5	2 18 40	170.3	2.4	3 13 20	+ 0.4	12.2
2 0 0	66.7	11.3	2 19 20	168.4	3.0	3 14 0	9.0	12.2
2 0 40	- 74.5	-11.0	2 20 0	-166.2	+ 3.5	3 14 40	+ 17.5	+12.1
2 1 20	82.1	10.7	2 20 40	163.5	4.1	3 15 20	26.0	12.1
2 2 0	89.5	10.4	2 21 20	-160.4	+ 4.7	3 16 0	+ 34.4	+12.0
2 2 40	- 96.7	-10.1						

### SATELLITE III.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h. m.	"	"	d. h. m.	"	"	d. h. m.	"	"
0 0 0	+ 0.0	+17.4	0 21 20	+194.7	+12.4	1 18 40	+277.2	+ 0.2
0 1 20	13.5	17.4	0 22 40	204.1	11.8	1 20 0	277.0	- 0.6
0 2 40	26.9	17.3	1 0 0	213.0	11.1	1 21 20	276.2	1.5
0 4 0	40.3	17.2	1 1 20	221.4	10.5	1 22 40	274.7	2.3
0 5 20	53.6	17.1	1 2 40	229.3	9.8	2 0 0	272.6	3.2
0 6 40	+ 66.8	+16.9	1 4 0	+236.6	+ 9.1	2 1 20	+269.8	- 4.0
0 8 0	79.8	16.7	1 5 20	243.3	8.3	2 2 40	266.4	4.8
0 9 20	92.7	16.4	1 6 40	249.5	7.6	2 4 0	262.3	5.6
0 10 40	105.3	16.1	1 8 0	255.1	6.8	2 5 20	257.6	6.4
0 12 0	117.6	15.8	1 9 20	260.0	6.0	2 6 40	252.3	7.2
0 13 20	+129.7	+15.4	1 10 40	+264.3	+ 5.2	2 8 0	+246.4	- 8.0
0 14 40	141.5	15.0	1 12 0	268.0	4.4	2 9 20	240.0	8.7
0 16 0	153.0	14.5	1 13 20	271.1	3.6	2 10 40	233.0	9.4
0 17 20	164.1	14.0	1 14 40	273.6	2.7	2 12 0	225.4	10.1
0 18 40	174.7	13.5	1 16 0	275.5	1.9	2 13 20	217.3	10.8
0 20 0	+184.9	+13.0	1 17 20	+276.7	+ 1.1	2 14 40	+208.6	-11.5



# JUPITER'S SATELLITES, 1860. 457

COORDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE III.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h. m.			d. h. m.			d. h. m.		
2 16 0	+199.5	-12.1	4 6 40	-158.4	-14.3	5 20 0	-255.1	+ 6.8
2 17 20	189.9	12.7	4 8 0	169.3	13.8	5 21 20	249.5	7.6
2 18 40	179.9	13.3	4 9 20	179.8	13.3	5 22 40	243.3	8.3
2 20 0	169.4	13.8	4 10 40	189.9	12.7	6 0 0	236.6	9.1
2 21 20	158.5	14.3	4 12 0	199.5	12.1	6 1 20	229.3	9.8
2 22 40	+147.2	-14.8	4 13 20	-208.6	-11.5	6 2 40	-221.4	+10.5
3 0 0	135.6	15.2	4 14 40	217.3	10.8	6 4 0	213.0	11.1
3 1 20	123.7	15.6	4 16 0	225.5	10.1	6 5 20	204.1	11.8
3 2 40	111.5	16.0	4 17 20	233.1	9.4	6 6 40	194.7	12.4
3 4 0	99.0	16.3	4 18 40	240.1	8.7	6 8 0	184.9	13.0
3 5 20	+ 86.3	-16.6	4 20 0	-246.5	- 8.0	6 9 20	-174.7	+13.5
3 6 40	73.3	16.8	4 21 20	252.3	7.2	6 10 40	164.1	14.0
3 8 0	60.2	17.0	4 22 40	257.6	6.4	6 12 0	153.0	14.5
3 9 20	47.0	17.2	5 0 0	262.3	5.6	6 13 20	141.5	15.0
3 10 40	33.6	17.3	5 1 20	266.4	4.8	6 14 40	129.7	15.4
3 12 0	+ 20.2	-17.4	5 2 40	-269.8	- 4.0	6 16 0	-117.6	+15.8
3 13 20	+ 6.7	17.4	5 4 0	272.6	3.2	6 17 20	105.2	16.1
3 14 40	- 6.8	17.4	5 5 20	274.7	2.3	6 18 40	92.6	16.4
3 16 0	-20.3	17.4	5 6 40	276.2	1.5	6 20 0	79.8	16.7
3 17 20	33.7	17.3	5 8 0	277.0	- 0.6	6 21 20	66.8	16.9
3 18 40	- 47.1	-17.2	5 9 20	-277.2	+ 0.2	6 22 40	- 53.6	+17.1
3 20 0	60.3	17.0	5 10 40	276.7	1.1	7 0 0	40.3	17.2
3 21 20	73.4	16.8	5 12 0	275.5	1.9	7 1 20	26.9	17.3
3 22 40	86.3	16.6	5 13 20	273.7	2.7	7 2 40	- 13.4	17.4
4 0 0	99.0	16.3	5 14 40	271.2	3.6	7 4 0	+ 0.1	17.4
4 1 20	-111.5	-16.0	5 16 0	-268.1	+ 4.4	7 5 20	+ 13.6	+17.4
4 2 40	123.7	15.6	5 17 20	264.4	5.2	7 6 40	27.0	17.3
4 4 0	135.7	15.2	5 18 40	-260.1	+ 6.0	7 8 0	+ 40.4	+17.2
4 5 20	-147.2	-14.8						

## SATELLITE IV.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h.			d. h.			d. h.		
0 0	+ 0.0	+34.8	2 0	+332.3	+25.5	4 0	+486.2	+ 2.5
0 3	22.8	34.8	2 3	348.6	24.3	4 3	487.3	+ 0.8
0 6	45.6	34.7	2 6	364.1	23.1	4 6	487.3	- 0.8
0 9	68.3	34.5	2 9	378.9	21.9	4 9	486.3	2.4
0 12	90.9	34.2	2 12	392.9	20.6	4 12	484.2	4.1
0 15	+113.2	+33.9	2 15	+406.0	+19.3	4 15	+480.9	- 5.7
0 18	135.3	33.5	2 18	418.2	17.9	4 18	476.6	7.3
0 21	157.1	33.0	2 21	429.5	16.5	4 21	471.3	8.9
1 0	178.5	32.4	3 0	439.8	15.0	5 0	465.0	10.4
1 3	199.6	31.8	3 3	449.1	13.5	5 3	457.7	12.0
1 6	+220.3	+31.1	3 6	+457.5	+12.0	5 6	+449.3	-13.5
1 9	240.4	30.3	3 9	464.9	10.5	5 9	439.9	15.0
1 12	260.0	29.5	3 12	471.3	8.9	5 12	429.6	16.4
1 15	279.0	28.6	3 15	476.6	7.3	5 15	418.4	17.9
1 18	297.4	27.6	3 18	480.8	5.7	5 18	406.2	19.3
1 21	+315.2	+26.6	3 21	+484.0	+ 4.1	5 21	+393.1	-20.6



# 458 JUPITER'S SATELLITES, 1860.

COÖRDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE IV.

t		x'	y'	t		x'	y'	t		x'	y'
d.	h.			d.	h.			d.	h.		
6	0	+379.2	-21.9	9	18	-240.1	-30.3	13	12	-457.6	+12.0
6	3	364.4	23.1	9	21	259.7	29.5	13	15	449.3	13.5
6	6	348.8	24.3	10	0	278.7	28.6	13	18	440.0	15.0
6	9	332.5	25.5	10	3	297.2	27.6	13	21	429.7	16.4
6	12	315.4	26.6	10	6	315.0	26.6	14	0	418.5	17.8
6	15	+297.6	-27.6	10	9	-332.1	-25.5	14	3	-406.3	+19.2
6	18	279.2	28.5	10	12	348.4	24.4	14	6	393.2	20.6
6	21	260.2	29.4	10	15	363.9	23.2	14	9	379.3	21.9
7	0	240.6	30.3	10	18	378.7	21.9	14	12	364.6	23.1
7	3	220.5	31.1	10	21	392.7	20.6	14	15	349.1	24.3
7	6	+199.9	-31.8	11	0	-405.8	-19.3	14	18	-332.8	+25.4
7	9	178.8	32.4	11	3	418.0	17.9	14	21	315.7	26.5
7	12	157.4	33.0	11	6	429.3	16.5	15	0	298.0	27.5
7	15	135.6	33.5	11	9	439.6	15.0	15	3	279.6	28.5
7	18	113.5	33.9	11	12	449.0	13.5	15	6	260.5	29.4
7	21	+ 91.2	-34.2	11	15	-457.4	-12.0	15	9	-240.9	+30.3
8	0	68.7	34.5	11	18	464.8	10.5	15	12	220.8	31.1
8	3	46.0	34.7	11	21	471.2	8.9	15	15	200.2	31.8
8	6	23.2	34.8	12	0	476.5	7.3	15	18	179.2	32.4
8	9	+ 0.3	34.8	12	3	480.8	5.7	15	21	157.7	33.0
8	12	- 22.5	-34.8	12	6	-484.0	- 4.1	16	0	-135.9	+33.5
8	15	45.3	34.7	12	9	486.2	2.5	16	3	113.8	33.9
8	18	68.0	34.5	12	12	487.3	- 0.8	16	6	91.5	34.2
8	21	90.5	34.2	12	15	487.3	+ 0.8	16	9	69.0	34.5
9	0	112.9	33.9	12	18	486.3	2.4	16	12	46.3	34.7
9	3	-135.0	-33.5	12	21	-484.2	+ 4.0	16	15	- 23.5	+34.8
9	6	156.8	33.0	13	0	480.9	5.7	16	18	- 0.6	34.8
9	9	178.2	32.4	13	3	476.6	7.3	16	21	+ 22.2	34.8
9	12	192.3	31.8	13	6	471.3	8.9	17	0	+ 45.0	+34.7
9	15	-220.0	-31.1	13	9	-465.0	+10.5				



## THE APPARENT ELEMENTS OF SATURN'S RING.

Sidereal Date Oh.	<i>a</i> Outer Major Axis.	<i>b</i> Outer Minor Axis.	<i>p</i> Inclination of Northern Semiminor Axis to Circle of Declination from North to East.	<i>l</i> The Elevation of the Earth above the Plane of the Ring.	<i>l'</i> The Elevation of the Sun above the Plane of the Ring.	<i>u</i> <i>u'</i> Earth's Longitude from Saturn counted on Plane of Ring from the Ring's As- cending Node on	
						Equator.	Ecliptic.
0	44.23	8.75	— 6° 42.4	— 11° 24.2	— 13° 15.0	204° 9.4	160° 51.3
20	45.24	9.38	6 46.4	11 58.2	12 57.6	203 7.8	159 49.8
40	45.65	10.03	6 51.6	12 41.3	12 40.2	201 43.6	158 25.7
60	45.37	10.50	6 56.7	13 23.1	12 22.8	200 17.2	156 59.4
80	44.51	10.73	7 0.7	13 57.0	12 5.3	199 6.0	155 48.3
100	43.20	10.63	7 7.8	14 14.8	11 47.7	198 26.0	155 8.5
120	41.68	10.25	7 7.8	14 14.2	11 30.1	198 21.0	155 3.6
140	40.21	9.68	7 0.7	13 55.9	11 19.4	199 1.4	155 44.1
160	38.89	8.98	6 56.7	13 21.1	10 54.5	200 12.0	156 54.8
180	37.84	8.22	6 50.9	12 33.1	10 36.6	201 50.8	158 33.7
200	37.08	7.45	6 43.4	11 35.5	10 18.6	203 50.4	160 37.4
220	36.65	6.69	6 34.9	10 30.7	10 0.7	206 3.3	162 46.4
240	36.55	5.96	6 25.4	9 23.0	9 42.7	208 20.7	165 3.9
260	36.81	5.29	6 15.6	8 16.2	9 24.6	210 36.7	167 20.0
280	37.40	4.71	6 6.2	7 14.6	9 6.5	212 41.6	169 25.1
300	38.32	4.25	5 57.9	6 22.2	8 48.3	214 28.6	171 12.2
320	39.52	3.94	5 51.3	5 43.5	8 30.0	215 50.5	172 34.2
340	40.93	3.84	5 47.3	5 23.0	8 11.7	216 40.0	173 23.8
360	42.41	3.97	5 46.4	5 22.3	7 53.4	216 54.4	173 38.3
366	42.91	4.07	— 5 46.9	— 5 27.5	— 7 46.8	216 47.0	173 30.9

Factor which is to be multiplied by *a* and *b* to obtain the axes of

The inner ellipse of the outer Ring = 0.8801 log. Factor = 9.9445

The outer ellipse of the inner Ring = 0.8599 " = 9.9344

The inner ellipse of the inner Ring = 0.6650 " = 9.8228

The inner ellipse of Bond's dusky Ring = 0.5486 " = 9.7392

NOTE. — The sign of *l* indicates whether the visible surface of the Ring is northern or southern.

## THE APPARENT DISCS OF VENUS AND MARS.

The Versed Sines of their Illuminated Portions, divided by their Apparent Diameters.

1860.		Venus.	Mars.	1860.		Venus.	Mars.
January	15	0.897	0.918	July	15	0.005	1.000
February	15	0.833	0.898	August	15	0.186	0.958
March	15	0.745	0.884	September	15	0.430	0.892
April	15	0.625	0.882	October	15	0.591	0.861
May	15	0.468	0.903	November	15	0.714	0.856
June	15	0.241	0.955	December	15	0.807	0.867



· WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

	d.	h.	m.			d.	h.	m.			
Jan.	2	4	0	☉	in Perigee.	April	12	15	53	☿	in ☿
	3	9	0	☿	greatest elong. W. 22° 54'		14	14	44	☿	stationary.
	6	12	34	☿	greatest Hel. Lat. S.		17	23	43	♄	♄
	8	2	33	♄	♄ - 1 35		18	17	39	♄	♄
	10	10	58	♄	♄		19	19	43	♄	stationary.
	10	11	53	♄	♄		22	20	0	☿	in Aphelion.
	15	16	38	☿	☿ in ☿		23	7	13	♄	♄
	16	17	31	♄	♄		24	7	16	♄	♄
	20	15	9	♄	♄		26	10	23	♄	♄
	22			☉	Eclipsed, invis. at Wash.		27	7	7	☿	greatest Hel. Lat. N.
	25	2	18	♄	☿		28	17	19	♄	♄
	25	20	43	☿	☿ in Aphelion.		30	2	52	☿	greatest elong. W. 26° 39'
	26	22	50	♄	♄	May	9	2	14	☿	greatest elong. E. 45° 24'
Feb.	4	8	21	♄	♄		9	6	52	☿	☿
	6			☉	Eclipsed, vis. at Wash.		9	15	44	♄	♄
	6	19	25	♄	♄		13	6	4	☿	greatest Hel. Lat. S.
	10	9	4	♄	stationary.		15	9	3	♄	♄
	11	9	10	♄	♄		18	15	44	♄	♄
	14	5	49	♄	♄		20	16	38	♄	♄
	15	6	51	☿	☿		23	15	30	♄	☿
	18	21	52	♄	☉ Sup.		23	23	36	♄	♄
	21	10	49	♄	☿		26	0	46	♄	♄
	22	11	18	☉	☉		28	8	58	♄	☉
	23	6	47	♄	♄	June	31	6	54	♄	☿
	24	13	9	♄	☿		1	5	50	☿	in ☿
March	2	15	29	♄	♄		2	9	4	♄	☿
	2	19	12	☿	☿ in ☿		5	19	36	☿	in Perihelion.
	5	3	21	♄	♄		5	23	25	☿	☿
	5	6	37	☿	☿ in ☿		6	15	14	♄	☿
	9	20	21	☿	☿ in Perihelion.		11			☿	at greatest brilliancy.
	10	7	27	♄	stationary.		11	18	14	♄	♄
	13	18	31	♄	♄		16	3	33	☿	greatest Hel. Lat. N.
	15	13	50	☿	☿		17	3	47	♄	♄
	16	5	40	☉	☉		17	19	24	♄	stationary.
	16	11	30	♄	♄		19	16	56	♄	☿
	19	15	34	☿	☿ in ☿		19	20	48	☉	☉
	19	15	57	☉	☉ enters ♈, spring begins.		20	12	35	☉	☉ enters ♉, sum'r begins.
	20	4	15	☿	☿		20	15	53	♄	♄
	21	15	1	♄	♄		21	1	56	☿	☿
	23	3	27	☿	stationary.		22	8	47	☿	in ☿
	23	5	55	♄	☿		22	10	34	♄	♄
	25	14	11	☿	☿		25	14	11	☿	stationary.
	26	23	30	♄	♄		28	9	25	♄	☿
	29	23	57	♄	♄	July	1	1	24	♄	☿
April	1	10	38	♄	♄		1	3	41	☉	in Apogee.
	2	5	9	♄	☉ Inf.		2	3	17	☿	stationary.
	5	0	37	☿	☿ in Perihelion.		3	21	32	♄	☿
	5	2	43	☉	☉		7	5	21	☿	☿
	11	6	48	♄	♄		9	2	27	♄	♄
	11	8	40	♄	☿		9	15	8	☿	in ☿



WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

	d.	h.	m.			
July	12	13	54	♂	☉	greatest elong. E. 26 37
	14	15	41	♂	☉	☉ . . . . . ♂ - 4 13
	16	20	0	♂	☉	☉
	17			♂	☉	Eclipsed, vis. at Wash.
	17	20	30	♂	♀	☉ . . . . . ♀ - 6 13
	18	8	5	♂	♀	☉ Inf.
	18	10	54	♂	♀	☉ . . . . . ♀ + 0 44
	19	17	19	♂	♀	☉ - 0 12
	19	19	17	♂	♀	in Aphelion.
	19	23	26	♂	♀	☉ . . . . . ♀ + 3 46
	25	18	30	♀	☉	stationary.
	26	13	25	♀	☉	in Aphelion.
	28	18	20	♂	♀	☉
	30	14	47	♂	♀	☉ . . . . . ♂ - 5 30
	Aug. 1			♂	☉	Eclipsed, invis. at Wash.
	5	9	3	♂	♀	☉ . . . . . ♀ - 6 26
	8	19	14	♀	☉	stationary.
	9	5	14	♀	☉	greatest Hel. Lat. S.
	9	12	43	♂	♀	☉ Inf.
	11	2	48	♂	☉	☉ . . . . . ♂ - 4 8
	13	17	20	♂	♀	☉ . . . . . ♀ - 7 50
	15	7	31	♂	♀	☉ . . . . . ♀ + 1 23
	15	11	8	♂	♀	☉ . . . . . ♀ - 2 43
	16	14	58	♂	♀	☉ . . . . . ♀ + 4 6
	18	5	20	♀	☉	greatest Hel. Lat. S.
	18	8	30	♂	☉	stationary.
	18	19	57	♀	☉	stationary.
	21	18	26	♂	♀	☉
	23			♀	☉	at greatest brilliancy.
	23	6	52	♂	☉	greatest Hel. Lat. S.
	26	17	1	♂	♂	☉ . . . . . ♂ - 4 29
	27	1	0	♀	☉	greatest elong. W. 18 12
	28	5	5	♀	☉	in ☉
	1	14	10	♂	♀	☉ . . . . . ♀ - 6 20
	1	18	58	♀	☉	in Perihelion.
	3	16	2	♂	☉	☉
	6	9	40	♂	♀	☉ . . . . . ♀ + 0 11
	7	11	36	♂	☉	☉ . . . . . ♂ - 3 57
	11	6	21	♂	☉	☉ - 3 12
	12	2	48	♀	☉	greatest Hel. Lat. N.
	12	4	7	♂	♀	☉ . . . . . ♀ + 2 5
	13	7	41	♂	♀	☉ . . . . . ♀ + 4 20
	14	6	30	♂	♀	☉ + 6 3
	16	0	5	♂	☉	in Perihelion.
	16	11	14	♂	☉	stationary.
	20	1	35	♂	♀	☉
	21	9	17	♂	☉	Sup.
	22	2	44	♂	☉	enters ☉, autumn begins.
	23	14	16	♂	☉	☉ . . . . . ♂ - 3 53
	27	18	52	♂	☉	greatest elong. W. 46 10
Sept.	28	8	54	♂	♀	☉ . . . . . ♀ - 2 10
	28	18	40	♂	♀	☉ . . . . . ♀ - 6 16
	4	17	34	♂	♀	☉ - 3 44
	5	14	24	♂	♀	☉ in ☉
	9	22	37	♂	♀	☉ . . . . . ♀ + 2 50
	10	17	33	♂	♀	☉ . . . . . ♀ + 2 51
	10	23	29	♂	♀	☉ . . . . . ♀ + 4 57
	13	19	5	♂	♀	☉ in ☉
	14	5	1	♂	♀	☉ . . . . . ♀ - 1 30
	15	2	12	♂	♀	☉ . . . . . ♀ + 4 2
	15	18	31	♀	☉	in Aphelion.
	22	1	50	♂	☉	☉ . . . . . ♂ - 4 8
	25	23	43	♂	☉	☉ . . . . . ♂ - 6 20
	31	21	48	♂	☉	☉ . . . . . ♂ - 3 35
	Nov. 5	4	28	♀	☉	greatest Hel. Lat. S.
	6	12	56	♂	♀	☉ . . . . . ♀ + 3 33
	6	22	31	♂	♀	☉ greatest elong. E. 22 53
	7	12	15	♂	♀	☉ . . . . . ♀ + 5 29
	9	11	43	♂	♀	☉ . . . . . ♀ + 7 4
	13	21	31	♂	♀	☉ . . . . . ♀ + 0 57
	16	0	37	♀	☉	in Perihelion.
	17	6	44	♀	☉	stationary.
	17	10	11	♂	☉	☉
	19	21	51	♂	♂	☉ . . . . . ♂ - 4 52
	22	6	13	♂	♀	☉ . . . . . ♀ - 6 31
	22	21	20	♂	☉	☉
	24	4	22	♂	☉	in ☉
	27	7	47	♂	☉	Inf.
	28	2	22	♂	☉	☉ . . . . . ♂ - 3 35
	28	18	8	♀	☉	in Perihelion.
Dec.	30	9	58	♂	☉	☉
	1	5	52	♂	☉	☉
	3	22	6	♂	♀	☉ . . . . . ♀ + 4 4
	4	20	56	♂	♀	☉ . . . . . ♀ + 5 57
	6	21	57	♀	☉	stationary.
	7	12	40	♀	☉	stationary.
	8	0	1	♀	☉	greatest Hel. Lat. N.
	9	2	5	♀	☉	greatest Hel. Lat. N.
	9	5	27	♂	♀	☉ . . . . . ♀ + 7 12
	10	9	16	♂	♀	☉ . . . . . ♀ + 6 58
	12	12	34	♀	☉	stationary.
	15	22	41	♀	☉	greatest elong. W. 21 27
	17	13	19	♂	☉	☉
	18	21	47	♂	♂	☉ . . . . . ♂ - 5 32
	19	14	21	♂	♀	☉ . . . . . ♀ - 6 41
	20	2	52	♀	☉	stationary.
	20	20	43	☉	☉	enters ☉, winter begins.
	25	8	44	♂	☉	☉ . . . . . ♂ - 3 41
	30	9	33	♂	☉	in Perigee.
	31	3	6	♂	♀	☉ . . . . . ♀ + 4 16



# LATITUDES AND LONGITUDES OF THE PRINCIPAL OBSERVATORIES.

COMPILED BY DR. B. A. GOULD.

HAVING been requested by Commander DAVIS to arrange for the *Astronomical Ephemeris* a Table of Latitudes and Longitudes of the principal Observatories, I have devoted some time and attention to the critical preparation of this catalogue. But since the values decided upon differ considerably in many cases from those in the other published catalogues, and in some few instances from the values which appear to be made use of at the Observatories themselves, I feel some hesitation in publishing them without asking the attention of astronomers to the catalogue, that such inaccuracies as it may contain may be corrected as speedily as possible. The sources of information are given in each case, and when possible the probable error also is given with the determination. One important change consists in the adoption of the differences of longitude between Altona and Pulkowa, and Greenwich and Altona, as determined by STRAUVE in his chronometric expeditions of 1843 and 1844. The adoption of these values necessarily implies a corresponding change for the longitude of those Observatories whose position has been fixed by their difference of longitude from Altona or Pulkowa, or from other Observatories dependent upon these. The differences of longitude of the American Observatories are deduced from the telegraphic determinations of the United States Coast-Survey, — and have been communicated by Professor BACHE, by authority of the Honorable Secretary of the Treasury. I have endeavored to include in the list all Observatories now in a state of astronomical activity, or which have been so within the last quarter of a century. Any corrections or additions with which astronomers may favor me will be gratefully acknowledged.

Åbo. . . . N. Lat.  $60^{\circ} 26' 56''.8 \pm 0''.11$ . ARGELANDER, *Obs. Astron.*, I. p. xxi.  
Long. E. from Paris,  $1^h 19^m 47^s.3$ . *Astr. Nachr.*, IX. 264.

This Observatory was abandoned, and the instruments transferred, together with the University of Finland, to Helsingfors, in consequence of the great fire of 1827, by which the University buildings, library, &c. were destroyed.

Altona. . . . N. Lat.  $53^{\circ} 32' 45''.27$ . GAUSS, *Bestimmung des Breiten-Unterschiedes zwischen den Sternwarten von Göttingen und Altona*, p. 71. In the edition of SCHUMACHER'S *Hülftafeln*, published by WARNSTORFF, Altona, 1845, the latitude of Altona is given p. 114, as  $+53^{\circ} 32' 45''.7$ .



Long. E. from Greenwich,  $0^h 39^m 46^s.151 \pm 0^s.042$ . STRUVE, *Expéd. Chronomet. exécutée en 1844, entre Altona et Greenwich*, p. 206.

**Ann Arbor.** . . N. Lat.  $42^\circ 16' 48''$ . *Astron. Journ.*, V. 112.

Long. W. from Washington,  $0^h 27^m 12^s.0$ .

**Athens.** . . . N. Lat.  $37^\circ 58' 20'' \pm 1''$ . BOURIS, *Astr. Nachr.*, XXXIII. 197.

Long. E. from Paris,  $1^h 25^m 34^s.23 \pm 1^s$ . *Ergänzungs-Heft zu den Astr. Nachr.*, 1849, p. 151. This longitude was obtained from moon-culminating stars observed on ten nights at Athens and Hamburg. The result of a series observed at Athens and Copenhagen gave the longitude of Athens  $6^s.84$  farther East, but this series was rejected. *Ibid.*, pp. 150, 151, 158. Diminishing the E. longitude of Hamburg in conformity with STRUVE's chronometric determination, we have for the longitude of the meridian-circle  $1^h 25^m 33^s.73 \pm 1^s$ .

The centre of the Observatory is  $0^s.19$  W. from the meridian-circle, *Erg.-Heft z. d. Astr. Nachr.*, p. 152.

**Berlin.** . . . N. Lat.  $52^\circ 30' 16''.68 \pm 0''.2$ . ENCKE, *Astr. Nachr.*, XXIII. 372.

For the Longitude of the centre of the Observatory, we have

Berlin E. from Altona,	$0^h 13^m 48^s.78 \pm 0.03$	<i>Berl. Astr. Jahrb.</i> ,
Altona E. from Greenwich,	$0^h 39^m 46^s.15$	[1839, p. 275.
Berlin " "	$0^h 53^m 34^s.93$	

The old Observatory was situated  $0^\circ 56''.72$  North (*Berl. Astr. Jahrb.*, 1839, p. 242; *Astr. Nachr.*, XXIII. 370), and  $0^s.39$  West (*Ibid.*, pp. 261, 265), of the new one. Hence we have for the old Berlin Observatory,

N. Lat.,  $52^\circ 31' 13''.4$ .

Long. E. from Greenwich,  $0^h 53^m 34^s.54$ .

**Bilk.** . . . N. Lat.  $51^\circ 12' 25''$ . *Astr. Nachr.*, XXVII. 300.

Long. W. from Berlin,  $0^h 26^m 30^s.0$ . *Ibid.*

**Bonn.** . . . N. Lat.  $50^\circ 43' 45''.0$ . } Orally communicated by Prof.  
Long. E. from Paris,  $0^h 19^m 3^s.0$ . } ARGELANDER to the compiler.

The provisional Observatory on the "Alter Zoll," in which were made the observations published in Vol. I. of the Bonn series, was situated in

N. Lat.  $50^\circ 44' 9''$ .

Long. E. from Paris,  $0^h 19^m 5^s.5$ . *Bonn Astr. Beob.*, I. p. i.

**Breslau.** . . . N. Lat.  $51^\circ 6' 56''.0$ . (MS. communication from Professor BOGUSLAWSKI to Professor ENCKE.) *Berl. Astr. Jahrb.*, 1852, p. 289. The value given in the *Berl. Jahrb.* previously to 1851, was  $51^\circ 6' 30''.0$ .

The Longitude given in the table is derived from a mean of four determinations of the longitude E. from Paris, viz. : —



		Triangulation in 1805 (fire-signals), <i>Astr. Nachr.</i> ,	
		XVI. 371,	<sup>h</sup> <sup>m</sup> <sup>s</sup> 0 58 48.6
		STECZKOWSKI (6 star-immersions), <i>Ibid.</i> ,	48.17
		HANSEN (occultations), <i>Astr. Nachr.</i> , XVII. 170.	48.74
		ERMAN and PETERSEN (meteors), <i>Astr. Nachr.</i> ,	
		XIX. 27,	48.67
		Mean, Breslau E. from Paris,	0 58 48.54
Brussels. . . .	N. Lat. 50° 51' 10".7.	<i>Annales de l'Obs. de Bruxelles</i> , 1837,	
		p. 264.	
	Long. W. from Greenwich, 0° 17' 27".6.	QUETELET, <i>Mém. de l'Acad. R. de Bruxelles</i> , XVI. 18.	
Cambridge (Eng.).	N. Lat. 52° 12' 51".76.	<i>Camb. Phil. Trans.</i> , V. 279.	
	Long. E. from Greenwich, 0° 0' 23".54.	<i>Ibid.</i> , III. 168.	
Cambridge (Mass.).	N. Lat. 42° 22' 48".60.	PEIRCE, <i>Mém. Amer. Acad.</i> , N. S., II. 203.	
	Long. by the telegraphic determinations of the U. S. Coast-Survey,		
	Cambridge E. from Stuyvesant Garden, N. Y.,		
	By 34 sets of clock-signals,	<sup>h</sup> <sup>m</sup> <sup>s</sup>	0 11 26.10
	" 10 " " star-signals (Western),		26.13
	" 24 " " " (exchanged E. and W.),		25.96
	" 17 " " " (Eastern),		26.18
	Mean,		0 11 26.09
	Geodetic reduction to dome of Cambridge Observa-		
	tory,		—0.02
	Stuyvesant Garden E. of Jersey City (geodetic),		0 11.93
	Cambridge E. from C. S. Station, Jersey City,		0 11 38.00
	Jersey City E. from Washington (see Philadelphia),		0 12 3.54
	Cambridge (dome) E. from Washington,		0 23 41.54
Cape of Good Hope.	S. Lat. 33° 56' 3".	HENDERSON, <i>Mém. R. Astr. Soc.</i> , VI. 130.	
	Long. E. from Greenwich,		
	By Greenwich Observations, 1 13 56.1	<i>Ibid.</i> , p. 126.	
	" Cambridge " 55.04	" p. 127.	
	" Åbo " 58.56	" p. 128.	
	" Edinburgh " 54.2	" p. 129.	
	Mean, .	1 13 56.0	
Christiania. . . .	N. Lat. 59° 54' 43".7.	} <i>Astron. Journ.</i> , II. 173.	
	Long. E. from Paris, 0° 33' 33".3.		
Cincinnati. . . .	N. Lat. 39° 5' 54".	<i>Astr. Nachr.</i> , XXIII. 313.	
	Long. W. from Washington, 0° 29' 46".85.	(U. S. Coast-Sur-	
	vey.) <i>Proc. Amer. Assoc. for Adv. Science</i> , Cincinnati, 1851,		
	p. 118.		



**Copenhagen.** By Copenhagen Observatory is usually understood the "Round Tower" of the University. The new instruments are, however, mounted in a temporary wooden building known as "Holkens Bastion." (See *Astr. Nachr.*, XIX. 119).

N. Lat. of the Round Tower,  $55^{\circ} 40' 53''.0$ . *Astr. Nachr.*, V. 366.

For the Longitude,

Holkens Bastion E. from Altona,	
HANSEN ( <i>Astr. Nachr.</i> , VIII. 281),	<sup>h.</sup> <sup>m.</sup> <sup>s.</sup> 0 10 32.585 139.88
SCHUMACHER ( <i>Astr. Nachr.</i> , IX. 463),	32.565 19.42
Mean,	10 32.583
Altona E. from Greenwich,	39 46.151
Holkens Bastion E. from Greenwich,	50 18.734
Round Tower E. from Holkens Bastion	
(WURM, <i>Astr. Nachr.</i> , III. 438; V. 337),	0.57
Round Tower E. from Greenwich,	0 50 19.30

**Cracow** . N. Lat.  $50^{\circ} 3' 50''.0 \pm 0.09$ . WEISSE, *Astr. Nachr.*, VIII. 175; XVI. 256.

Longitude E. from Paris,

Mean of 18 obs. by WURM ( <i>Astr. Nachr.</i> , VIII. 459), (6 of the 25 being rejected),	<sup>h.</sup> <sup>m.</sup> <sup>s.</sup> 1 10 28.986 $\pm 0.461$
Mean of 25 obs. by STECZKOWSKI ( <i>Astr. Nachr.</i> , XVI. 352),	30.221 $\pm 0.301$
Mean of 4 obs. by STECZKOWSKI ( <i>Astr. Nachr.</i> , XVIII. 332),	29.760 $\pm 0.085$
Mean of 16 obs. of three occultations (STECZKOWSKI, <i>Astr. Nachr.</i> , X. 232),	30.95 $\pm 0.253$
Assigning to each of these determinations a weight proportional to the number of observations from which it was derived, we obtain the mean,	

Cracow E. from Paris,	1 10 29.78
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**Derpat.** . N. Lat.  $58^{\circ} 22' 47''.05$ . STRUVE, *Observ. Astron.*, VI. p. lx.

Long. E. from Paris,	<sup>h.</sup> <sup>m.</sup> <sup>s.</sup> 1 37 32.70	WURM, <i>Astr. Nachr.</i> , III. 437.
	33.5	BESSEL, " III. 46.
Mean,	1 37 33.1	

**Dublin.** . N. Lat.  $53^{\circ} 23' 13''$ .

Long. W. from Greenwich,  $0^{\text{h}} 25^{\text{m}} 22^{\text{s}}$ . *Astr. Nachr.*, X. 274.

**Durham.** . N. Lat.  $54^{\circ} 46' 6''.4$ .

Long. W. from Greenwich,  $0^{\text{h}} 6^{\text{m}} 18^{\text{s}}.0$ . *Astr. Nachr.*, XXVI. 215



- Edinburgh.** . N. Lat.  $55^{\circ} 57' 23''.2$ .  
 Long. W. from Greenwich,  $0^{\text{h}} 12^{\text{m}} 43^{\text{s}}.0$ . *Edinb. Observ.*, X. p. v.
- Florence.** . N. Lat.  $43^{\circ} 46' 40''.8$ . ZACH, *Corresp. Astron.*, I. 15.  
 Long. E. from Paris,  $0^{\text{h}} 35^{\text{m}} 40^{\text{s}}.2$ . *Ibid.*, p. 14.
- Geneva.** . . N. Lat. by observations of pole-star,  $46^{\circ} 11' 58''.72 \pm 0''.1$   
 " " " nadir-point,  $58.97 \pm 0.1$   
 Mean,  $46\ 11\ 58.84$  PLANTAMOUR, *Mém. de la Soc. de Physique et d'Hist. Nat. de Genève*, XI. 15.  
 Long. E. from Paris,  $0^{\text{h}} 15^{\text{m}} 16^{\text{s}}.22$ . *Astr. Nachr.*, XX. 7.
- Georgetown.** N. Lat.  $38^{\circ} 54' 26''.1$ . *Astron. Journ.*, I. 69.  
 Long. W. from Washington,  $0^{\text{h}} 0^{\text{m}} 6^{\text{s}}.20$ . *Astron. Journ.*, I. 70.
- Göttingen.** . GAUSS found, *Best. d. Breit.-Untersch.*, p. 71, for the N. Latitude of the meridian-circle,  $51^{\circ} 31' 47''.85$ , with the weight 60.9.  
 The Longitude of the same GAUSS found (*Ibid.*) by his trigonometrical survey to be West of the meridian-circle in Altona by 7211 Paris Toises. Using BESSEL's data we find  $1'' = 148.33$  Toises, whence we have,
- |                              |  |
|------------------------------|--|
| Gottingen West of Altona,    | $\begin{array}{r} \text{h} \quad \text{m} \quad \text{s} \\ 0 \quad 0 \quad 0.049 \end{array}$ |
| Altona East of Greenwich,    | $\begin{array}{r} 0 \quad 39 \quad 46.151 \end{array}$   |
| Gottingen East of Greenwich, | $\begin{array}{r} 0 \quad 39 \quad 46.102 \end{array}$   |
- For the old Observatory,  
 Lat. =  $+51^{\circ} 31' 55''.6$ . *Monatl. Corr.*, XXVII. 483.  
 Long. E. of Paris,  $0^{\text{h}} 30^{\text{m}} 25^{\text{s}}.2$ . *Astr. Nachr.*, II. 407, 408.
- Gotha.** . . (Seeberg.)  
 N. Lat.  $50^{\circ} 56' 5''.19$ . GAUSS, *Best. d. Breit.-Untersch.*, p. 80.  
 For the Longitude E. from Paris,  
 WURM found by 11 occultations (*Astr. Nachr.*, II. 405),  $\begin{array}{r} \text{h} \quad \text{m} \quad \text{s} \\ 0 \quad 33 \quad 34.8 \end{array} \pm 0.13$   
 PETERS found (*Astr. Nachr.*, V. 68),
- |                           | $\begin{array}{r} \text{h} \quad \text{m} \quad \text{s} \\ 3 \quad 10.2 \quad 2 \end{array}$ | Weight. |
|---------------------------|---|---------|
| Seeberg East from Altona, | $\begin{array}{r} 3 \quad 10.2 \quad 2 \end{array}$   | 2       |
| " " Göttingen,            | $\begin{array}{r} 3 \quad 8.9 \quad 15 \end{array}$   | 15      |
| West " Königsberg,        | $\begin{array}{r} 39 \quad 5.6 \quad 18 \end{array}$  | 18      |
| East " Paris,             | $\begin{array}{r} 33 \quad 34.3 \quad 24 \end{array}$   | 24      |
| West " Vienna,            | $\begin{array}{r} 22 \quad 38.0 \quad 17 \end{array}$   | 17      |
- Whence, using the present data, we find,  
 Seeberg E. from Paris,  $\begin{array}{r} 0 \quad 33 \quad 33.66 \end{array}$   
 Mean,  $\begin{array}{r} 0 \quad 33 \quad 34.2 \end{array}$
- For the Observatory attached to Professor HANSEN's house,  
 Long. E. from Paris,  $0^{\text{h}} 33^{\text{m}} 30^{\text{s}}.046$ . SCHUMACHER, *Astr. Nachr.*, XXIII. 263.



- Greenwich.** . N. Lat.  $51^{\circ} 28' 38''.2$ . AIRY, *Mem. Astr. Soc.*, XVII. p. 49.  
 Long. W. from Paris,  $0^h 9^m 21''.46 \pm 15$ . HENDERSON, *Phil. Trans.*, 1827, p. 286. See also Washington.
- Hamburg.** . N. Lat.  $53^{\circ} 33' 7''$ , by geodetical connection with Altona. *Preface to Rümker's Catalogue.*  
 The Longitude given in the table is derived thus :  
     Hamburg E. from Altona (HANSEN, *Astr. Nachr.*, VIII. 277),  $\begin{smallmatrix} h. & m. & s. \\ 0 & 0 & 7.41 \end{smallmatrix}$   
     Altona E. from Greenwich (STRUVE, *Exp. Chron. de 1844*),  $0 \ 39 \ 46.15$   
     Whence Hamburg E. from Greenwich,  $0 \ 39 \ 53.56$
- Hudson.** . . N. Lat.  $41^{\circ} 14' 42''.6$ . LOOMIS, *Trans. Am. Phil. Soc.*, N. S., X. 61.  
 Long. W. from Philadelphia (U. S. Coast-Survey),  $\begin{smallmatrix} h. & m. & s. \\ 0 & 25 & 5.72 \end{smallmatrix}$   
     By 3 sets Eastern clock-signals,  $5.68$   
     " 2 " Western "  $0 \ 25 \ 5.70$   
     Philadelphia E. from Washington,  $7 \ 33.64$   
     Hudson W. from Washington,  $0 \ 17 \ 32.06$   
     Professor LOOMIS deduced from moon-culminations,  
     Hudson W. from Greenwich,  $5^h 25^m 41''.3$ . *Astr. Journ.*, I. 67.
- Kazan.** . . N. Lat.  $55^{\circ} 47' 23''.1$ . *Astr. Nachr.*, XXVIII. 47.  
 Long. E. from Berlin,  $2^h 22^m 57''.0$ . *Berl. Astr. Jahrb.*, 1854, p. 293.
- Königsberg.** . N. Lat.  $54^{\circ} 42' 50''.4$ . BESSEL, *Astr. Nachr.*, I. 248.  
 Long. E. from Paris,  $\begin{smallmatrix} h. & m. & s. \\ 1 & 12 & 38.8 \end{smallmatrix}$  WURM, *Astr. Nachr.*, III. 437.  
      $38.93$  BESSEL, " III. 46.  
     Mean,  $1 \ 12 \ 38.9$
- Kremsmünster.** N. Lat.  $48^{\circ} 3' 23''.81 \pm 0''.03$ . *Astr. Nachr.* XXXVII. 271.  
 Long. E. from Paris,  $0^h 47^m 11''.96$ . SCHUMACHER, *Astr. Nachr.*, XXIII. 263.
- Leipzig.** . . (Pleissenburg.)  
 N. Lat. D'ARREST, *Astr. Nachr.*, XXVIII. 148,  $\begin{smallmatrix} 51^{\circ} 20' 20.7 \pm 0.36 \end{smallmatrix}$  Weight.  $26.37$   
     D'ARREST, *Astr. Nachr.*, XXVIII. 160,  $20.4$   
 Long. E. from Greenwich,  $0^h 49^m 28''.5$ .
- Leyden.** . . N. Lat.  $52^{\circ} 9' 28''.16 \pm 0''.15$  } KAISER, *Astr. Nachr.*,  
 Long. E. from Paris,  $0^h 8^m 35''.97 \pm 0''.19$  } XVII. 100.
- Liverpool.** . N. Lat.  $+53^{\circ} 24' 47''.72$ . *M. Notices Astr. Soc.* XIII., 247.  
 Long. W. from Greenwich,  $0^h 12^m 0''.11$  *Naut. Alm.*, 1852, p. 598.



**London.** . (Mr. Bishop's Observatory.)

N. Lat.  $51^{\circ} 31' 29''.8$ . *Astr. Obs. at the Observatory South Villa*,  
p. xix.

Long. W. from Greenwich,  $0^{\text{h}} 0^{\text{m}} 37^{\text{s}}.1$ .

**Madras.** . N. Lat.  $13^{\circ} 4' 9''.2$ .

Long. E. from Greenwich,  $5^{\text{h}} 20^{\text{m}} 57^{\text{s}}$ . TAYLOR, *Madras General*  
*Catal.*, 1844, Pref. p. ii.

**Mannheim.** N. Lat.  $49^{\circ} 29' 12''.9$ . *Astr. Nachr.*, XII. 129.

Long. E. from Paris, as determined

By WURM, from occultations ( <i>Astr. Nachr.</i> , VIII. 458),	$0^{\text{h}} 24^{\text{m}} 29.92^{\text{s}}$
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“ connection with Strasburg ( <i>Astr. Nachr.</i> , XV. 280),	29.87
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“ “ “ Vienna ( <i>Astr. Nachr.</i> , XV. 279; XXIII. 263),	30.28
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By connection with Dunkirk (MÜFFLING, <i>Astr. Nachr.</i> , XV. 279),	30.05
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By OLUFSEN from Solar Eclipse ( <i>Astr. Nachr.</i> , XXII. 234),	30.10
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Mean,	$0^{\text{h}} 24^{\text{m}} 30.04^{\text{s}}$
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**Markree.** . N. Lat.  $54^{\circ} 10' 31''.72$ . *Astr. Journ.*, II. 12.

Long. W. from Greenwich,  $0^{\text{h}} 33^{\text{m}} 48^{\text{s}}.4$ . *Naut. Alm.*, 1852, p. 598.

**Marseilles.** N. Lat.  $43^{\circ} 17' 49''$ . *Monatl. Corresp.*, XIII. 139.

Long. E. from Paris, according to

LINDENAU ( <i>Monatl. Corr.</i> , XIX. 421),	No. Obs. 4	$0^{\text{h}} 12^{\text{m}} 7.7^{\text{s}}$
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WURM ( <i>Monatl. Corr.</i> , XXVI. 185),	19	7.6
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“ ( <i>Astr. Nachr.</i> , IV. 33),	12	7.5
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INNES ( <i>Astr. Nachr.</i> , VIII. 435),	4	7.05
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Mean,	$0^{\text{h}} 12^{\text{m}} 7.53^{\text{s}}$
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**Milan.** . (Brera.)

N. Lat.  $45^{\circ} 28' 0''.7$ . *Corresp. Astron.*, V. 300; *Effem. Astr. di Mi-*  
*lano*, 1846, App., pp. 73–86.

Long. E. from Paris,

DAUSSY found from 31 occultations ( <i>Conn. d. Temps</i> , 1836, <i>Add.</i> , p. 131),	$0^{\text{h}} 27^{\text{m}} 24.91^{\text{s}}$
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LITTROW found Milan W. from Vienna ( <i>Ibid.</i> ),	$28^{\text{m}} 45.63^{\text{s}}$
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56 11.07
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$0^{\text{h}} 27^{\text{m}} 25.44^{\text{s}}$
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Mean,	$0^{\text{h}} 27^{\text{m}} 25.18^{\text{s}}$
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**Modena.** . N. Lat.  $44^{\circ} 38' 52''.75$ . BIANCHI, *Astr. Nachr.*, XVI. 221; *Atti del R.*  
*Osserv. di Modena*, I. 336 (1834).

Long. E. from Milan,  $0^{\text{h}} 6^{\text{m}} 55^{\text{s}}.99$ . *Id.*, p. 337.

Hence E. from Paris,



By comparison with Milan,	<sup>h.</sup> 0 <sup>m.</sup> 34 <sup>s.</sup> 20.45	
WURM from occultations,	23.5	<i>Astr. Nachr.</i> , I. 504.
“ “ “	24.5	“ III. 222.
STECZKOWSKI from occultations,	21.81	“ XVI. 299, 302.
OLUFSEN from solar eclipse,	<u>22.32</u>	“ XXII. 234.
Mean,	0 34 22.51	

- Moscow.** . N. Lat.  $55^{\circ} 45' 19''.8$ . SCHWEIZER, *Astr. Nachr.*, XXVII. 215.  
 Long. Moscow E. from Pulkowa, <sup>h.</sup> 0 <sup>m.</sup> 28 <sup>s.</sup> 58.2 *Astr. Nachr.*, XXIV. 90.  
 Pulkowa E. from Greenwich, 2 1 19.09  
 Moscow “ “ “ 2 30 17.29
- Munich.** . (Bogenhausen.)  
 N. Lat.  $48^{\circ} 8' 45''$ . SOLDNER, *Astr. Nachr.*, IX. 422.  
 Long. E. from Paris,  $0^{\text{h}} 37^{\text{m}} 4^{\text{s}}.98$ . *Astr. Nachr.*, VIII. 148.
- Naples.** . N. Lat.  $40^{\circ} 51' 46''.63$ . BRIOSCHI, *Astr. Nachr.*, V. 294.  
 The Longitude adopted is that by which PETERS has apparently made his reductions, *Astr. Nachr.*, XXIII. 302, 303, according to which we have,  
 Naples E. from Berlin,  $0^{\text{h}} 3^{\text{m}} 26^{\text{s}}.0$ .  
 For determinations from solar eclipses by BRIOSCHI and SANTINI, see  
*Astr. Nachr.*, VI. 413.
- Olmutz.** . . N. Lat.  $49^{\circ} 35' 40''$ .  
 Long. E. from Greenwich,  $1^{\text{h}} 9^{\text{m}} 0^{\text{s}}.1$ . } *Astr. Nachr.*, XXXVII. 77.
- Oxford.** . N. Lat.  $51^{\circ} 45' 36''.0$   
 Long. W. from Greenwich,  $0^{\text{h}} 5^{\text{m}} 2^{\text{s}}.6$  } *Naut. Alm.*, 1852, p. 599.
- Padua.** . N. Lat.  $45^{\circ} 24' 2''.5$ . SANTINI, *Astr. Nachr.*, VI. 411; XVII. 346.  
 Long. E. from Paris,  
 WURM (*Astr. Nachr.*, IV. 347), <sup>h.</sup> 0 <sup>m.</sup> 38 <sup>s.</sup> 7.7  
 Padua E. from Milan by powder signals  
 (FALLON, *Astr. Nachr.*, IV. 115), <sup>h.</sup> 0 <sup>m.</sup> 10 <sup>s.</sup> 43.27  
 Milan E. from Paris, 27 24.18  
0 38 7.45  
 Mean, Padua E. from Paris, 0 38 7.57
- Palermo.** . N. Lat.  $38^{\circ} 6' 44''$ . CACCIATORE, *Del Real Osservatorio di Palermo Libri VII., VIII., IX.*, p. 2; *Storia Celeste del R. Osserv. di Palermo*, in *Ann. d. Wiener Sternwarte*, XXIV. 6.  
 Long. E. from Paris,  $0^{\text{h}} 44^{\text{m}} 4^{\text{s}}.0$ . DAVSSY, *Add. Conn. d. Temps*, 1835, p. 8.  
 BIANCHI, *Astr. Nachr.*, XVII. 350, calls the latitude of the Palermo Observatory,  $+38^{\circ} 6' 25''.50$ .
- Paramatta.** S. Lat.  $33^{\circ} 48' 49''.79$ . RÜMKE, *Phil. Trans.*, 1829, Part III. p. 16.  
 Long. E. from Greenwich,  $10^{\text{h}} 4^{\text{m}} 6^{\text{s}}.25$ . *Ibid.*, p. 29.



**Paris.** . . N. Lat.  $48^{\circ} 50' 18''.2$ . *Conn. d. Temps*, 1835, p. 356.  
Long. as above under Greenwich.

**St. Petersburg.** (Academy.)  
N. Lat.  $59^{\circ} 56' 29''.67$ .  
Long. W. from Pulkowa,  $0^{\text{h}} 5^{\text{m}}.194$ . *STRUVE, Description de l'Obs. de Poulkova*, p. 292.

**Philadelphia.** N. Lat.  $39^{\circ} 57' 7''.5$ . MS. communication from Professor KENDALL.  
Long. E. from Washington (U. S. Coast Survey),  
By 5 sets Eastern clock-signals,  $7^{\text{m}} 33.66^{\text{s}}$   
" " Western "  $33.60$   
Mean,  $7^{\text{m}} 33.63$   
Long. Jersey City Station E. from Washington,  
By 2 sets Eastern clock-signals,  $12^{\text{m}} 3.58^{\text{s}}$   
" " Western "  $3.52$   
Mean,  $12^{\text{m}} 3.56$   
Long. W. from Jersey City Station,  
By 8 sets Eastern clock-signals,  $4^{\text{h}} 29.91^{\text{m}}$   
" " " "  $29.84$   
Mean,  $4^{\text{h}} 29.88^{\text{m}}$

Hence we may use,

Jersey City Station E. from Philadelphia,	$0^{\text{h}} 4^{\text{m}} 29.89^{\text{s}}$
" " " Washington,	$0^{\text{h}} 12^{\text{m}} 3.53^{\text{s}}$
Philadelphia, " "	$0^{\text{h}} 7^{\text{m}} 33.64^{\text{s}}$

**Prague.** . . N. Lat.  $50^{\circ} 5' 18''.5$ . DAVID, *Astr. Nachr.*, VIII. 198.

Long. E. from Paris,

Mean of 6 occultations (*Astr. Nachr.*, XVI. 299,  $0^{\text{h}} 48^{\text{m}} 21.66^{\text{s}} \pm 4.15$   
302),

HANSEN from occultations (*Astr. Nachr.*, XVII.  
170),  $19.59 \pm 3.67$

Mean, Prague E. from Paris,  $0^{\text{h}} 48^{\text{m}} 20.50^{\text{s}}$

**Pulkowa.** . . N. Lat.  $59^{\circ} 46' 18''.70$ . *STRUVE, Descr. de l'Obs. de Poulkova*, p. 290.

Long. E. from Altona (*Exp. Chron. de 1843*,  
p. 144),  $1^{\text{h}} 21^{\text{m}} 32.523^{\text{s}} \pm 0.039$

Altona E. from Greenwich (*Exp. Chron.*  
*de 1844*, p. 206),  $0^{\text{h}} 39^{\text{m}} 46.151^{\text{s}} \pm 0.042$

Pulkowa E. from Greenwich (*Exp. Chron.*  
*de 1844*, p. ix.),  $2^{\text{h}} 1^{\text{m}} 18.674^{\text{s}} \pm 0.057$

**Rome.** . . (Collegio Romano.)

N. Lat.  $41^{\circ} 53' 54''$ . *Conn. d. Temps*, 1840, p. 354.

Long. E. from Greenwich,  $0^{\text{h}} 49^{\text{m}} 54''.7$ . *Astr. Nachr.*, VIII. 88.



- San Fernando.** N. Lat.  $36^{\circ} 27' 45''$ . *Corresp. Astron.*, XIV. 240.  
 Long. W. from Paris,  $0^{\text{h}} 34^{\text{m}} 10^{\text{s}}.6 \pm 0^{\text{s}}.31$ . *Astr. Nachr.*, IX. 358.
- Santiago.** . (Observatory of the U. S. Astronomical Expedition.)  
 S. Lat.  $33^{\circ} 26' 25''.9$ . GILLISS, *Astron. Exped., Introd.*, III.  
 Long. W. from Greenwich,  $4^{\text{h}} 42^{\text{m}} 33^{\text{s}}.81$ . GILLISS, *Astron. Exped., Introd.*, III.
- Senftenberg.** . N. Lat.  $50^{\circ} 5' 10''.1$ . }  
 Long. E. from Berlin,  $0^{\text{h}} 12^{\text{m}} 15^{\text{s}}$ . } *Astr. Nachr.*, XXXI. 174, 331.
- Vienna.** . . N. Lat.  $48^{\circ} 12' 35''.5$ . *Berl. Astr. Jahrb.*, 1852, p. 290.  
 Long. E. from Paris,  $0^{\text{h}} 56^{\text{m}} 11^{\text{s}}.07$ . SCHUMACHER, *Astr. Nachr.*, XXIII. 263.
- Washington.** . N. Lat.  $38^{\circ} 53' 39''.25$ . *Astron. Journ.*, III. 12.  
 Long. W. from Greenwich, as derived from data of the U. S. Coast Survey, up to 1852,  $5^{\text{h}} 8^{\text{m}} 11^{\text{s}}.2$ .  
 Lieutenant MAURY uses  $5^{\text{h}} 8^{\text{m}} 10^{\text{s}}.17$ . *Astron. Journ.*, III. 12.  
 The situation of the first, or provisional, Naval Observatory, in which were made the observations published by Lieutenant GILLISS was,  
 N. Lat.  $38^{\circ} 53' 32''.8$ . GILLISS, *Astr. Obs.*, p. viii.  
 Long. W. from Greenwich,  $5^{\text{h}} 8^{\text{m}} 4^{\text{s}}.6$ . *Ibid.*, p. x.
- Wilna.** . . N. Lat.  $54^{\circ} 40' 59''.1$ . *Astr. Nachr.*, IV. 562.  
 Long. E. from Paris,  
     WURM from 22 occultations (*Astr. Nachr.*, VIII. 96),  $\begin{array}{r} \text{h} \quad \text{m} \quad \text{s} \\ 1 \quad 31 \quad 50.4 \end{array}$   
     STECZKOWSKI from 1 occultation (*Astr. Nachr.*, XVI. 302),  $\begin{array}{r} \text{h} \quad \text{m} \quad \text{s} \\ \quad \quad \quad 48.3 \end{array}$   
     Mean,  $\begin{array}{r} \text{h} \quad \text{m} \quad \text{s} \\ 1 \quad 31 \quad 50.31 \end{array}$

These results are arranged in the following Table for reference.



## POSITIONS OF THE PRINCIPAL OBSERVATORIES.

*(North Latitudes and West Longitudes are considered as positive.)*

Place.	Latitude.	Longitude from Washington in Time.	Longitude from Washington in Arc.	Longitude from Greenwich in Arc.
Åbo, . . . . .	+60° 26' 56.8	— 6 <sup>h</sup> 37 <sup>m</sup> 20.0 <sup>s</sup>	260° 40' 0.6	337° 42' 46.6
Altona, . . . . .	+53 32 45.3	— 5 47 57.4	273 0 39.8	350 3 27.8
Ann Arbor, . . . . .	+42 16 48.0	+ 0 27 12.0	6 48 0.0	83 50 48.0
Athens, . . . . .	+37 58 20.0	— 6 43 6.4	259 13 24.2	336 16 12.2
Berlin, . . . . .	+52 30 16.7	— 6 1 46.1	269 33 28.1	346 36 16.1
Bilk, . . . . .	+51 12 25.0	— 5 35 16.1	276 10 58.1	353 13 46.1
Bonn, . . . . .	+50 43 45.0	— 5 36 35.7	275 51 5.1	352 53 53.1
Breslau, . . . . .	+51 6 56.0	— 6 16 21.2	265 54 42.0	342 57 30.0
Brussels, . . . . .	+50 51 10.7	— 5 25 38.8	278 35 18.0	355 38 6.0
Cambridge (Eng.), . . . . .	+52 12 51.8	— 5 8 34.7	282 51 18.9	359 54 6.9
Cambridge (Mass.), . . . . .	+42 22 48.6	— 0 23 41.5	354 4 36.9	71 7 24.9
Cape of Good Hope, . . . . .	—33 56 3.0	— 6 22 7.2	264 28 12.3	341 31 0.3
Christiania, . . . . .	+59 54 43.7	— 5 51 6.0	272 13 30.6	349 16 18.6
Cincinnati, . . . . .	+39 5 54.0	+ 0 29 46.9	7 26 42.8	84 29 30.8
Copenhagen, . . . . .	+55 40 53.0	— 5 58 30.5	270 22 22.5	347 25 10.5
Cracow, . . . . .	+50 3 50.0	— 6 28 2.4	262 59 23.4	340 2 11.4
Dorpat, . . . . .	+58 22 47.1	— 6 55 5.8	256 13 32.6	333 16 21.6
Dublin, . . . . .	+53 23 13.0	— 4 42 49.2	289 17 42.0	6 20 30.0
Durham, . . . . .	+54 46 6.4	— 5 1 53.2	284 31 42.0	1 34 30.0
Edinburgh, . . . . .	+55 57 23.2	— 4 55 28.2	286 7 57.0	3 10 45.0
Florence, . . . . .	+43 46 40.8	— 5 53 12.9	271 41 47.1	348 44 35.1
Geneva, . . . . .	+46 11 58.8	— 5 32 48.9	276 47 46.8	353 50 34.8
Georgetown, . . . . .	+38 54 26.1	+ 0 0 6.2	0 1 33.0	77 4 21.0
Göttingen, . . . . .	+51 31 47.9	— 5 47 57.3	273 0 40.5	350 3 28.5
Gotha, . . . . .	+50 56 5.2	— 5 51 6.9	272 13 17.1	349 16 5.1
Greenwich, . . . . .	+51 28 38.2	— 5 8 11.2	282 57 12.0	0 0 0.0
Hamburg, . . . . .	+53 33 7.0	— 5 48 4.8	272 58 48.6	350 1 36.6
Hudson, . . . . .	+41 14 42.6	+ 0 17 32.1	4 23 0.9	81 25 48.9
Kasan, . . . . .	+55 47 23.1	— 8 24 43.1	233 49 13.1	310 52 1.1
Königsberg, . . . . .	+54 42 50.4	— 6 30 11.6	262 27 6.6	339 29 54.6
Kremsmünster, . . . . .	+48 3 23.8	— 6 4 44.6	268 48 50.7	345 51 38.7
Leipsic, . . . . .	+51 20 20.7	— 5 57 39.7	270 35 4.5	347 37 52.5
Leyden, . . . . .	+52 9 28.2	— 5 26 8.6	278 27 50.6	355 30 38.6
Liverpool, . . . . .	+53 24 47.7	— 4 56 11.1	285 57 13.7	3 0 1.7
London, . . . . .	+51 31 29.8	— 5 7 34.1	283 6 28.5	0 9 16.5
Madras, . . . . .	+13 4 9.2	—10 29 8.2	202 42 57.0	279 45 45.0
Mannheim, . . . . .	+49 29 12.9	— 5 42 2.7	274 29 19.5	351 32 7.5
Markree, . . . . .	+54 10 31.7	— 4 34 22.8	291 24 18.0	8 27 6.0
Marseilles, . . . . .	+43 17 49.0	— 5 29 40.2	277 34 57.2	354 37 45.2
Milan, . . . . .	+45 28 0.7	— 5 44 57.8	273 45 32.4	350 48 20.4
Modena, . . . . .	+44 38 52.8	— 5 51 55.2	272 1 12.5	349 4 0.5
Moscow, . . . . .	+55 45 19.8	— 7 38 28.5	245 22 52.7	322 25 40.7
Munich, . . . . .	+48 8 45.0	— 5 54 37.6	271 20 35.4	348 23 23.4
Naples, . . . . .	+40 51 46.6	— 6 5 12.1	268 41 58.1	345 44 46.1
Olmütz, . . . . .	+49 35 40.0	— 6 17 11.3	265 42 10.5	342 44 58.5
Oxford, . . . . .	+51 45 36.0	— 5 3 8.6	284 12 51.0	1 15 39.0
Padua, . . . . .	+45 24 2.5	— 5 55 40.2	271 4 56.6	348 7 44.6
Palermo, . . . . .	+38 6 44.0	— 6 1 36.7	269 35 50.1	346 38 38.1
Paramatta, . . . . .	—33 48 49.8	+ 8 47 42.6	131 55 38.3	208 58 26.3
Paris, . . . . .	+48 50 13.2	— 5 17 32.7	280 36 50.1	357 39 38.1



Place.	Latitude.	Longitude from Washington in Time.	Longitude from Washington in Arc.	Longitude from Greenwich in Arc.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>
St. Petersburg, . .	+59° 56' 29.7	—7 9 24.7	252° 38' 49.8	329° 41' 37.8
Philadelphia, . . .	+39 57 7.5	—0 7 33.6	358 6 35.4	75 9 23.4
Prague, . . . . .	+50 5 18.5	—6 5 53.2	268 31 42.6	345 34 30.6
Pulkowa, . . . . .	+59 46 18.7	—7 9 29.9	252 37 81.9	329 40 19.9
Rome, . . . . .	+41 53 54.0	—5 58 5.9	270 28 31.5	347 31 19.5
San Fernando, . .	+36 27 45.0	—4 43 22.1	289 9 29.1	6 12 17.1
Santiago, . . . . .	—33 26 25.9	—0 25 37.4	353 35 39.1	70 38 27.1
Senftenberg, . . .	+50 5 10.1	—6 14 1.1	266 29 43.1	343 32 31.1
Vienna, . . . . .	+48 12 35.5	—6 13 43.7	266 34 4.1	343 36 52.1
Washington, . . .	+38 53 39.3	—0 0 0.0	0 0 0.0	77 2 48.0
Wilna, . . . . .	+54 40 59.1	—6 49 23.0	257 39 15.5	334 42 3.5



## ON THE ARRANGEMENT AND USE OF THE TABLES IN THIS EPHEMERIS.

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THIS Ephemeris is divided into two distinct parts. One part is designed for the special use of NAVIGATORS, and is adapted to the Meridian of Greenwich.

The other part is suited to the convenience of ASTRONOMERS, on this continent particularly, and is adapted to the Meridian of Washington.

### THE NAUTICAL PART.

This part contains the Ephemeris of the Sun and Moon; the Distances of the Moon from the centres of the Sun and the four most conspicuous Planets, and from certain Fixed Stars; the Ephemeris of the Planets Venus, Mars, Jupiter, and Saturn; the Mean Places of 100 principal Fixed Stars, for January 1, 1860.

*Time.* — Astronomers make use of several different kinds of time; an explanation of the nature of which, and of the method of passing from one to another, properly precedes an explanation of the uses of the Ephemeris.

*Sidereal Time.* — Sidereal Time is measured by the daily motion of the stars, or, as it is used by astronomers, by the daily motion of that point in the equator from which the true right ascensions of the stars are counted.

A *Sidereal Day* is the interval of time between the transit of the vernal equinox over any meridian, and its next succeeding return to the same meridian. It is divided into 24 hours. The sidereal hours are counted from 0 to 24, commencing with the instant of the passage of the true vernal equinox over the upper meridian, and ending with its return to the same meridian.

*Solar Time.* — Solar Time is measured by the daily motion of the sun. A *Solar Day* is the interval of time between two successive transits of the sun over the same meridian; and the hour angle of the sun is called *Solar Time*. This is the most natural and direct measure of time. But the intervals between the successive returns of the sun to the meridian are not exactly equal, but depend upon the variable motion of the sun in right ascension.

The want of uniformity in the sun's motion in right ascension arises from two different causes; one, that the sun does not move in the equator, but in the ecliptic; the other, that the sun's motion in the ecliptic is not uniform.

To avoid the irregularity in time caused by the want of uniformity in the sun's motion, a fictitious sun, called a *Mean Sun*, is supposed to move in the equator with a uniform velocity.

*Mean Time*, which is perfectly equable in its increase, is measured by the motion of this *Mean Sun*; the latter at certain periods agrees with the real sun, then again is in advance of it, and at other times is behind it.

*True or Apparent Time* is measured by the motion of the real sun.

The difference between the *true* and *mean* time is called the *Equation of Time*. By means of it we pass from *true* to *mean* time, or the reverse. Thus, if the *true* time be given, the *mean* time corresponding to it will be obtained by adding or subtracting the equation of time, according to the precept at the head of the column in which it is found, on page I. of the Calendar. If the *mean* time be given, the *true* time is obtained by applying the equation of time as directed by the precept on page II. of the Calendar.



The vernal equinox, by the motion of which Sidereal Time is measured, is not a fixed, but a movable, point on the equator. Its motion is composed of two parts: precession, which is proportional to the time, and is combined with the daily motion of the heavens; and nutation, which is periodical. In consequence of the latter, the daily motion of the equinox is not strictly a uniform measure of time, and the Sidereal Time in common use might therefore be called *Apparent Sidereal Time*, and *Mean Sidereal Time* would be that reckoned from the transit of the mean equinox; but the irregularity referred to cannot exceed  $2^{\circ}.3$  in a period of nineteen years, and is, therefore, of no practical importance.

*Day.* — According to the customs of society, the hours are counted from 0 to 12 from noon to midnight, after which they are again reckoned from 0 to 12 from midnight to noon. The *civil day* consists of twenty-four hours, but is divided in this manner into two periods, commencing at midnight. In this respect it differs from the *astronomical day*, which commences at noon. The *civil day* comprises twenty-four hours, from one midnight to the next following. The first period of twelve hours is marked A. M., the last period of twelve hours is marked P. M. The *astronomical day* also comprises twenty-four hours, but they are counted from 0 to 24, and from the noon of one day to that of the next following.

The civil day begins twelve hours before the astronomical day; therefore the first part of the *civil day* answers to the last part of the preceding *astronomical day*, and the last part of the *civil day* to the first part of the same *astronomical day*. Thus, January 10th,  $2^{\text{h}}$  A. M., *civil day*, is January 9th,  $14^{\text{h}}$ , *astronomical day*; and January 9th,  $2^{\text{h}}$  P. M., *civil day*, is also January 9th,  $2^{\text{h}}$ , *astronomical day*. The rule, then, for the transformation of the civil time into astronomical time is this: If the civil time is marked A. M., take one from the date, and add twelve to the hours, and the result is the astronomical time wanted; if the civil time is marked P. M., take away the designation P. M., and the astronomical time is had without further change.

The Calendar is divided into twelve months, and to each month are assigned eighteen pages, of which the contents are as follows: —

Pages I., II., III. are devoted to the Ephemeris of the Sun. Page I. contains, first, the *Apparent Right Ascension and Declination* of the sun at Greenwich apparent noon.

The former of these quantities is used for finding the error of a clock regulated to sidereal time. The difference between the time by the clock of the meridian passage of the sun, and the sun's right ascension reduced to apparent noon, is the error of the clock from sidereal time. It is also employed in determining the time by the transit of a fixed star over the meridian, as is explained in page 223 of BOWDITCH'S *American Practical Navigator*. The use of the sun's declination in finding the true amplitude and azimuth, the latitude by altitudes of the sun in and out of the meridian, the time, &c., is also so clearly defined in this standard work, which is in the hands of all American seamen, that any further explanation in this place is unnecessary. Adjoining the columns of *Right Ascension* and *Declination* are the differences of these quantities for one hour (at noon), by means of which they may be calculated for any time out of the meridian, by multiplying this difference by the hours and parts of hours from noon, and adding the amount to, or subtracting it from, the quantity at noon, according as it is increasing or decreasing. If, for example, the declination of the sun were required at  $3^{\text{h}} 40^{\text{m}}$  P. M. of Wednesday, January 18th, 1860, the declination of the sun would be taken out first for

January 18th, at noon,	$20^{\circ} 38' 25.2''$ S.
From which subtract the diff. for 1 hour, $30^{\text{m}}.18$ , multiplied by 3,	$1 \ 30.5$
	$20 \ 36 \ 54.7$
And the proportional part for 40 minutes,	$20.1$
The result is the sun's declination on the 18th, at $3^{\text{h}} 40^{\text{m}}$ P. M.,	$20 \ 36 \ 34.6$



The difference for one hour is not the same for every hour in the twenty-four; but being given in the pages of this Ephemeris for the first hour of the day, it is sufficiently accurate for the purposes of the navigator.

The column of the *Sun's Semidiameter* requires no explanation.

The column headed *Sidereal Time of the Semidiameter passing the Meridian*, is employed in obtaining the passage of the sun's centre over the wires of a transit-instrument, when the passage of one limb only has been observed. If the western limb has been observed, the quantity found in this column is to be added to the time of transit over the middle wire, or the mean of the times of transit over all the wires; but if the eastern limb has been observed, the quantities in this column are to be subtracted.

The next column contains the *Equation of Time*, which, as has been before explained, is the number of minutes and seconds to be added to or subtracted from the *apparent time*, or the time given by an observation of the sun, to obtain the *mean time*, or the time shown by a clock. The heading of the column directs the manner in which the equation is to be applied, and where there is a change in the course of the month from addition to subtraction, or the reverse, as in the months of April and June, the two different directions are separated by a line, while a corresponding line below points out the date at which the change takes place. The difference for one hour is given in an adjoining column, by means of which the equation for any time from noon is easily obtained. If, for example, the equation of time for January 16th, at 3<sup>h</sup> 20<sup>m</sup> P. M., were required, we should have

Equation for January 16, at noon,	m.    s.
	9 52.81
Correction for 3 <sup>h</sup> 20 <sup>m</sup> (additive),	2.88
Equation, January 16, at 3 <sup>h</sup> 20 <sup>m</sup> P. M.,	9 55.69

Which, according to the rule at the head of the column, is to be added to *apparent time* to obtain *mean time*.

Page II. contains the Apparent Right Ascension and Declination of the Sun, and the Equation of Time for Greenwich *Mean Noon*; to these is added a column containing the Sidereal Time of Mean Noon.

Page III. contains the Longitude and Latitude of the Sun, and the Logarithm of the Distance of the Earth, at Greenwich Mean Noon of each day. The Longitude is given in two columns, headed  $\lambda$  and  $\lambda'$ ; the one,  $\lambda$ , is the Sun's longitude counted from the true equinox of the date; the other,  $\lambda'$ , is the same coördinate counted from the mean equinox of the beginning of the year. A column of hourly differences enables the computer to obtain the Sun's longitude for any hour from noon. The hourly differences of the logarithm of the Radius Vector are likewise given. The longitudes of the Sun are the true longitudes, not affected by aberration. The last column on this page contains the Mean Time of Sidereal Noon.

Page IV. contains the Moon's *Semidiameter* and *Horizontal Parallax* for every noon and midnight. The former may be corrected for any time between the dates for which it is given in the Ephemeris, by means of Table XI. of BOWDITCH'S *Navigator*, or simply by computing the proportional part.

This is readily done by considering that the semidiameter is given for every twelve hours, that the difference, therefore, between any two successive semidiameters corresponds to twelve hours, and that the difference required (or correction) is that difference which corresponds to a time less than twelve hours. If, for example, the semidiameter of the moon is to be taken out for 9 o'clock, P. M. of the 3d of January, then we say, that as twelve hours is to 7".0, the whole difference between the semidiameters at noon and midnight of the 3d, so is nine hours to 5".2, the correction to be added to the semidiameter at noon, because it is increasing; the moon's semidiameter, then, for Jan. 3<sup>d</sup> 9<sup>h</sup> is 15' 29".4. Adjoining the columns containing the Moon's



*Horizontal Parallax* for noon and midnight, are columns giving the change which these quantities undergo in one hour. The sign plus or minus (+ or —) is prefixed to these differences, showing whether they are additive or subtractive, or, in other words, whether the horizontal parallax is increasing or decreasing. In order to reduce the parallax to any time intermediate between those dates for which it is given in the Ephemeris, the mode of proceeding is that which has been already explained in the case of the equation of time. The Moon's *Meridian Passage*, which is given on this page to minutes and tenths of minutes, is also accompanied with a column of differences for one hour, by means of which, having the longitude turned into time, the time of the moon's meridian passage at any other place may be computed. Or it may be more quickly derived from BOWDITCH's Table XVIII., by simple inspection. The last column of this page contains the *Age* of the Moon, to tenths of days, or the time elapsed since the preceding new moon. It requires no explanation.

The pages from V. to XII. inclusive are taken up with the Moon's *Right Ascension and Declination*, which are given for every hour of every day in the month, and are accompanied with columns of differences for every minute of each hour. The right ascension and declination of the moon change so rapidly, that, if they were not given at frequent intervals, the moon would cease to be useful to the practical navigator as a means of determining the latitude and time. These quantities are wanted for Greenwich mean time, which is either taken directly from the face of a well-regulated chronometer, or is obtained by applying the longitude, turned into time, to the local time of the computer. They have only to be corrected for the minutes and seconds of the time at Greenwich. Thus, if the right ascension and declination of the moon were required for Sunday, January 1<sup>d</sup>. 8<sup>h</sup>. 10<sup>m</sup>., we have only to add to the right ascension at 8<sup>h</sup>. as given in the Ephemeris, viz. to 0<sup>h</sup>. 47<sup>m</sup>. 53<sup>s</sup>.93, the product of the difference for one minute in the adjoining column multiplied by 10, the product, that is, of 1<sup>s</sup>.8755 by 10, or 18<sup>s</sup>.76; the result is the moon's right ascension at the required time, equal to 0<sup>h</sup>. 48<sup>m</sup>. 12<sup>s</sup>.69. If we were to take out the declination for the same date, the correction for the ten minutes above the hour would be additive, because the declination, like the right ascension, is increasing; thus,—

Moon's declination for January 1 <sup>d</sup> . 8 <sup>h</sup> .	10 13 48.8 N.
Correction for 10 <sup>m</sup> . is 181 <sup>s</sup> .1, or	2 11.1
Moon's declination for January 1 <sup>d</sup> . 8 <sup>h</sup> . 10 <sup>m</sup> .	10 15 59.9

The last page of the right ascensions and declinations contains the *Phases* of the Moon, and the dates of the Moon's *Perigee* and *Apogee*, or least and greatest distances from the earth.

The remaining six pages of the month are occupied by the *Lunar Distances*. They are given in the same manner as in the *British Nautical Almanac*, in order to conform to the rules of BOWDITCH's *Navigator*. These tables contain the geocentric distances of the centre of the moon from the sun, the larger planets, and certain fixed stars, at intervals of three hours, beginning with the noon of each day. All the distances that can be observed on the same day are grouped together under that date, and the letter E. or W. is affixed to the name of the star or planet, to indicate whether it is on the east or west side of the moon. The columns are read from the left to the right, across both pages of the same opening. The principle of determining the longitude by means of lunar distances consists in this: that they furnish the navigator with the means of comparing his own time, on board ship, with the time at the Greenwich Observatory. At the moment of observing a distance he notes the time by his own watch or chronometer, and by looking into the Ephemeris he discovers what o'clock it is at Greenwich when the moon and star are in the relative position with regard to each other which he has measured with his sextant. But it will very rarely occur that the navigator's *true distance*, that is, his observed distance cleared from the effects of refraction and



lunar parallax, will be found in the Ephemeris. It will prove in most cases to be a quantity lying between two given distances. He is obliged, therefore, to take the difference between his own true distance and the one nearest to it in the pages of the Ephemeris, and to apply to the time standing over the latter a correction proportioned to this difference. This is a case of the simple rule of three. Owing, however, to the various denominations of space and time that enter into the question, it has been found convenient to lessen the labor of the operation by putting between every two successive distances given in the Ephemeris the proportional logarithm of their difference. This proportional logarithm is obtained by subtracting the logarithm of the difference of the two distances from the logarithm of three hours (both quantities being reduced to seconds), because three hours is the interval of time between two successive distances.

On the 9th of March, at midnight, of Greenwich mean time, the distance of the moon's centre from the planet Saturn, west of her, is  $63^{\circ} 57' 23''$ , and at fifteen hours of the same date it is  $65^{\circ} 47' 4''$ ; the difference between the two distances is  $1^{\circ} 49' 41''$ , or, reduced to seconds, is 6581", the logarithm of which, subtracted from the logarithm of three hours, or 10800", gives for the proportional logarithm of the difference between the two distances 2151, as it is in the column headed *P. L. of Diff.* If the calculated true distance of the navigator lie between the two given distances above mentioned, as, for instance, if it should be  $64^{\circ} 17' 54''$ , the corresponding correction of the time would be found as follows:—

Distance in the Ephemeris at Midnight,	$63^{\circ} 57' 23''$
Calculated True Distance,	$64^{\circ} 17' 54''$
Difference,	$0^{\circ} 20' 31''$
Prop. log. in Ephemeris,	2151
Prop. log. of Difference, $0^{\circ} 20' 31''$ ,	9492
Prop. log. of $0^h 33^m 40^s$ .	7281

And this time is to be added to the time at the head of the column from which the distance of the Ephemeris was taken, which would make the time at Greenwich corresponding to the Navigator's True Distance  $0^h 33^m 40^s$  on the morning of the 10th of March.

This method of getting the Greenwich time between two given times in the Ephemeris rests upon the supposition, that the variation between one distance and the next following is uniform and regular. But owing to the inequalities in the moon's motion, this is not the case; and it is, in consequence of this, necessary to apply to the Greenwich time obtained by the preceding method a small correction.

This correction, due to the second differences in the moon's motion, is given in the Table on page 28 of the Appendix, and is taken out and applied as follows.

The top of the Table is entered with the difference between that proportional logarithm of the Ephemeris which has already been used and the one next following, and the side of the Table is entered with the time which has been added to that at the head of the column of the Ephemeris, that is, the time given by the difference of the proportional logarithms at the close of the preceding paragraph; under the former, and opposite the latter, will be found the correction, in seconds of time, to be added to the time at Greenwich if the proportional logarithms are decreasing, but subtracted if they are increasing.

The Ephemeris of the Planets, from page 218 to page 241, consists of the apparent right ascension at Greenwich mean noon and its variation for one hour, the apparent declination at the same date and its variation for one hour, and the mean time of their meridian passage; and at the bottom of the page will be found the semidiameter and horizontal parallax for every fifth day of the month. The hourly variations belong to noon of the day on which they are given. The mode of correcting by means of the hourly variation for any time from noon has already been explained.



The Solar Coördinates for Greenwich mean noon, on pages 242–244, are added, and the Moon's Longitude and Latitude on pages 245–248.

Finally, the Mean Places of the one hundred principal Fixed Stars for January 1, 1860, are given on pages 256–258.

When the latitude is to be deduced from the meridian altitude of one of these stars, its time of passing the meridian can be ascertained by taking the sum of the right ascension of the star, and the mean time of sidereal noon contained in the last column of page III. of each month. The right ascension of the star is, in fact, its hour angle, or difference in time, from the sidereal noon, or 0<sup>h</sup>. If then a vessel in longitude 45° West should wish to obtain the latitude by a meridian observation of a star, as, for example,  $\alpha$  TAURI (*Aldebaran*), on the evening of January 1, 1860, the process for obtaining the time of meridian passage would be as follows:—

Mean Time of sidereal 0 <sup>h</sup> . January 1, 1860,	h. m. s.
Correction for Longitude omitted.	5 17 38
Right Ascension of $\alpha$ TAURI ( <i>Aldebaran</i> ),	4 27 53
Time of star's meridian passage,	9 45 31

The instant of passage might be more accurately determined by making an allowance for the difference between mean solar and sidereal time, and by applying the correction for longitude; but the above is sufficiently near for the purpose for which it is wanted, which is, to know the period of meridian passage approximately, in order to identify the star if necessary, and to be in time with the observation. The navigator will perceive that the dates in this column of page III. are astronomical, and will observe the distinctions of time explained in the first part of this article; he will also remember that when the sum exceeds 24 hours, 24 hours are to be subtracted, and a unit is to be added to the day of the month.

The Sun's Right Ascension may also be used for finding the time of meridian passage of a star, as shown in BOWDITCH's *Navigator*, p. 223.

NOTE.—The Right Ascension, Declination, Equation of Time, and Sidereal Time of Mean Noon, and also the Sun's Coördinates, have been computed from Hansen's Solar Tables, using Peters's Nutation and Obliquity, for the meridian of Washington, and interpolated for Greenwich. The Semidiameter, and Sidereal Time of Semidiameter passing the Meridian, have been computed as in the Almanacs for the preceding years.



## THE ASTRONOMICAL PART.

THIS part is adapted to the meridian of Washington.

*Obliquity of the Ecliptic, &c.*, p. 250. — On this page are given the apparent obliquity, the equation of equinoxes in longitude and right ascension, the precession of equinoxes in longitude, and the sun's aberration and horizontal parallax, for every ten days of the year; at the bottom of the page will be found the mean obliquity for the beginning of the year, the precession for the middle of the year, the logarithm of the precession in a sidereal day, and the logarithm of the precession in a solar day. On the same page, the mean longitude of the moon's ascending node is also given for every ten days, and at the bottom of the page its daily motion.

*Fixed Stars.* — The Logarithms *A, B, C, D*, for correcting the places of the Fixed Stars, are given for the mean midnight of every day of the year, and the constants of reduction for every five days. To these tables are added BESSEL's formulas of reduction, with PETERS' coefficients, and the notation of the catalogue of stars of the British Association.

The *mean* places of 100 principal Fixed Stars on January 1, 1860; the *apparent* places of  $\alpha$  and  $\delta$  Ursæ Minoris, at the time of the upper transit at Washington, for every day of the year; and the *apparent* places of the remaining principal stars for every ten days; together with a table giving the correction of 51 Cephei,  $\sigma$  Octantis, and  $\lambda$  Ursæ Minoris, for terms of nutation involving  $2\epsilon$ , — complete the subject of the Fixed Stars.

*Solar Ephemeris.* — In the Solar Ephemeris, given for Washington mean and apparent noon, the hourly motions in right ascension and declination are the motions at the instant of noon. Only the seconds of right ascension and declination are given for apparent noon, the degrees and minutes being usually the same as for mean noon.

The *Moon Culminations* and *Moon-culminating Stars* are given in two distinct lists. The list of Moon Culminations contains both the solar and sidereal dates of transit; the apparent right ascension is the right ascension of the limb, and the declination is the declination of the centre, at their respective periods of culmination. The form of the lists of moon-culminating stars has been somewhat changed. In the first volume of the Ephemeris, reference to the stars to be used in connection with the Moon was made by a figure, and the stars themselves were entered successively in the order of numbers. In the present volume these figures are dispensed with, and the proper star to be observed in connection with the transit of the moon's limb is determined by means of the sidereal dates, common to both lists. Each star occupies a separate column containing its right ascension to hundredths of seconds for every sidereal date throughout the year for which it is available, and also its declination and magnitude. The first column of each page contains the sidereal date, and the last the daily change in right ascension of the corresponding stars. It is hoped that the standard observatories will determine the place of each one of these stars once at least in the course of the year. The whole list has been taken from the Twelve-Year Catalogue.

The *Ephemeris of the Moon*, which follows, and the *Moon's Phases*, require no special observation. In the moon's ephemeris, as in that of the sun, the hourly motions belong to the instant for which they are given.

The ephemeris of the two interior planets is given for mean noon and the time of transit; and that of the exterior planets is given for sidereal noon and the time of transit. The place of a planet for any number of minutes  $t$ , from the nearest noon for which it is given,  $t$  being negative when the time precedes the noon, may be computed by the formula,

$$\text{Planet's R. A. (or Dec.)} = A + Bt + Ct^2,$$



in which  $A$  = R. A. (or Dec.) for the noon,  
 $B$  = the motion of R. A. (or Dec.) for 1 minute,  
 or, more exactly, = the factor of  $t$ , as given in the Ephemeris;  
 $C$  = the factor of  $t^2$  = factor for second differences.

The *Solar Coördinates* are given for each mean noon and midnight, referred to the apparent equinox and equator, and also to the mean equinox and equator, at the beginning of the year. In the case of the rectangular coördinates, only the last four decimals are given for the mean equinox and equator, and the first three places are to be taken from the apparent equinox and equator. When a change of a unit is to be made in the third place, it is indicated by a corresponding colon (:).

The *Planetary Coördinates* are given for days of the Julian Period, in order that they may be a part of a connected series, and therefore more convenient for the continued computation of perturbations.

*Eclipses.* — The *Tables of Data* of the *Solar Eclipses* are adapted to very accurate computation by the following formulas.

$$\begin{aligned} \text{Let } \phi &= \text{the latitude of the place,} \\ \lambda &= \text{its western longitude from Washington,} \\ \log e &= 8.9110835, \\ \log (1 - e^2) &= 9.9971066, \\ \sin \phi' &= e \sin \phi, \\ h &= \sec \phi' \cos \phi, \\ k &= (1 - e^2) \sec \phi' \sin \phi, \\ a &= A - h \sin (\mu - \lambda), \\ b &= B - E k + G h \cos (\mu - \lambda), \\ c &= -C + F k - H h \cos (\mu - \lambda), \\ m &= \sqrt{b c}. \end{aligned}$$

If the instant for computation were correctly chosen at the time of beginning or end of the eclipse,  $m$  would be exactly equal to  $a$ . If  $m$  is not equal to  $a$ , the instant for a new computation, which will be an approximation to the actual time of beginning or end, may be found by adding to the preceding time of computation an interval  $t$ , which may be obtained in seconds by the formulas,

$$\begin{aligned} \log \mu' &= 1.86167, \\ \tan \frac{1}{2} \psi &= \frac{c}{m} = \frac{m}{b}, \\ a' &= A' - \mu' h \cos (\mu - \lambda), \\ b' &= B' - \mu' G h \sin (\mu - \lambda), \\ t &= \frac{1000000 (m - a)}{a' + b' \cot \psi}; \end{aligned}$$

$\psi$  must be taken of the same sign with  $a$ , and is a sufficiently near approximation to the angle of contact from the north towards the east. For the shadow of a total eclipse,  $\psi$  must be taken with a sign opposite that of  $a$ .

The magnitude of the eclipse is found by taking the difference (with regard to the signs) of  $\psi$  at the beginning and end of the eclipse, and if this difference is denoted by  $2\theta$ , the magnitude of the eclipse is

$$\frac{24}{1-s} \sin^2 \frac{1}{2} \theta, \text{ or } \frac{24}{1-s} \cos^2 \frac{1}{2} \theta,$$

accordingly as  $\theta$  is acute or obtuse;  $s$  is the radius of the shadow divided by the radius of the penumbra.

The value of  $\theta$  may also be obtained by the formulas

$$\tan \chi = \frac{b'}{a'}, \quad \theta = \psi + \chi,$$



(in which  $\chi$  has the sign of  $b'$ ); and the expression of  $t$  may be changed to

$$t = 1000000 \cdot \frac{m-a}{a'} \cdot \frac{\cos \chi \sin \psi}{\sin \theta}.$$

The following is an example of the computation of the beginning of the Total Eclipse of July 17, for the Observatory at Ann Arbor, Michigan.

For Ann Arbor, $\phi + 42^\circ 16' 48''$		$\lambda + 6^\circ 48' 0''$	
$\log \sin \phi$	9.827856	$\log \cos \phi$	9.869153
$\log \sin \phi'$	8.738940	$\log \sec \phi'$	0.000653
$\log k$	9.825616	$\log h$	9.869806

From the chart take  $18^h 50^m$ , Washington mean time, as a first approximation to the time of beginning; but for a nearer approximation we find from the table (p. 399) for  $18^h 50^m$ .

$A - 1.18821$	$\log E$	9.971022
$B + 1.45871$	$\log F$	9.969491
$C + 0.38501$	$\log G$	9.548365
$A' + 151.47$	$\log H$	9.558797
$B' - 44.48$	$\mu$	$281^\circ 1' 7''.9$

Hence

$$\mu - \lambda = 274^\circ 13' 7''.9$$

$\log \cos (\mu - \lambda)$	8.866680	$\log \sin (\mu - \lambda)$	9.998822 $n$
$\log h \cos (\mu - \lambda)$	8.736486	$\log h \sin (\mu - \lambda)$	9.868628 $n$
$\log G h \cos (\mu - \lambda)$	8.284851	$\log H h \cos (\mu - \lambda)$	8.295283
$\log E k$	9.796638	$\log F k$	9.795107
$G h \cos (\mu - \lambda) + 0.01927$		$- H h \cos (\mu - \lambda) - 0.01974$	
$- E k - 0.62609$		$F k + 0.62389$	
$B + 1.45871$		$- C - 0.38501$	
$b + 0.85189$		$c + 0.21914$	
$\log b$	9.93038	$- h \sin (\mu - \lambda) + 0.73897$	
$\log c$	9.34072	$A - 1.18821$	
$\log m$	9.63555 $n$	$a - 0.44924$	
$\log \tan \frac{1}{2} \psi$	9.70517 $n$	$m - 0.43207$	
$\psi$	$306^\circ 12' 42''$	$m - a + 0.01717$	
$\log \mu' h \cos (\mu - \lambda)$	0.5982	$\log G \mu' h \sin (\mu - \lambda)$	1.2787 $n$
$- \mu' h \cos (\mu - \lambda) - 3.97$		$- G \mu' h \sin (\mu - \lambda) + 19.00$	
$a' + 147.50$		$b' - 25.48$	
$a' + b' \cot \psi + 166.16$		$\log b'$	1.4062 $n$
$\log 10^6 (m - a)$	4.2348	$\log \cot \psi$	9.8646 $n$
$\log (a' + b' \cot \psi)$	2.2205	$b' \cot \psi + 18.66$	
$\log t$	2.0143		

First approximation from chart	$18^h 50^m 0.0$
$t$ , the correction	$+ 1^m 43.3$
Washington mean time of beginning	$18^h 51^m 43.3$

Another approximation will increase the time of beginning by  $0^s.5$ , giving  $18^h 51^m 43^s.8$  as the correct time; the corrected times always being used in making the successive approximations.



*Occultations.*—The pages 404 to 424 inclusive are taken up with *Elements for Facilitating the Calculation of Occultations of Planets and Stars by the Moon*. These elements are given for all the stars to the fifth, and for some of the sixth magnitude, inclusive, contained in the British Association Catalogue, which can be occulted by the moon during the year 1860.

The several columns of these pages contain, — 1. the date; 2. the star's name; 3. the star's magnitude; 4. the limiting parallels of visibility; 5. Washington mean time of the moon's true conjunction with the star in right ascension; 6. Washington hour angle, in time, of the star at the time of true conjunction; 7. coördinate  $q$  at the time of true conjunction; 8. hourly variation  $p'$  of coördinate  $p$ ; 9. hourly variation  $q'$  of coördinate  $q$ ; 10. logarithmic sine of the star's declination; 11. logarithmic cosine of the star's declination.

Designating the time of true conjunction by the usual symbol,  $\delta$ , we have, at this time,  $T = \delta$ ,  $h = H$ ,  $p = 0$ , and  $q = Y$ . For any other time during the occultation, we shall have  $T = \delta + (t)$ ,  $h = H +$  sidereal equivalent of  $(t)$ ,  $p = (t) p'$ , and  $q = Y + (t) q'$ . The other elements are considered as constant for the occultation.

In the prediction of an occultation for a particular place, the principal objects of determination are, the instant of *immersion*, or of the star's disappearance behind the moon's limb; of *emersion*, or of the star's reappearance; and the points on the moon's border where these appearances take place.

The calculations are made according to the method of BESSEL, whose original paper on the subject may be found in SCHUMACHER'S *Astronomische Nachrichten*, Vol. VII. p. 1; also in the *Berliner Astronomisches Jahrbuch* for 1831, p. 257. The letters and numerals prefixed to the stars belonging to the group of the Pleiades, and the magnitudes of these stars, are taken from No. V. of BESSEL'S *Astronomische Untersuchungen*.

The process of computation is shown by the following equations:—

$d$  = Longitude for Washington, of the place, + West, — East

$\phi$  = Geographical North Latitude of the place.

$\phi'$  = Geocentric North Latitude of the place.

$r$  = Earth's radius at the place, or the distance of the observer's position from the earth's centre.

It is unnecessary to calculate  $\phi'$  and  $r$  separately, as we have

$$r \sin \phi' = \frac{(1 - e^2) \sin \phi}{\sqrt{(1 - e^2 \sin^2 \phi)}} \quad r \cos \phi' = \frac{\cos \phi}{\sqrt{(1 - e^2 \sin^2 \phi)}}$$

in which  $e$  denotes the eccentricity of the earth's meridians.

The logarithms of  $\frac{1 - e^2}{\sqrt{(1 - e^2 \sin^2 \phi)}} = \log A$ , and of  $\frac{1}{\sqrt{(1 - e^2 \sin^2 \phi)}} = \log B$ , derived from  $e = .081697$ , according to the latest determination of BESSEL, may be taken from the following table, where the geographical latitude of the place is the argument.

$\phi$	Log. $A$	Log. $B$
0	9.9971	0.0000
10	9.9971	0.0000
20	9.9973	0.0002
30	9.9975	0.0004
40	9.9977	0.0006
50	9.9979	0.0009
60	9.9982	0.0011
70	9.9984	0.0013

$$r \sin \phi' = A \sin \phi$$

$$r \cos \phi' = B \cos \phi$$



$$a = r \cos \phi' \sin (h - d)$$

$$b = r \cos \phi' \cos (h - d)$$

$$\log \lambda = 9.4192$$

$$u = a$$

$$u' = b \lambda$$

$$v = r \sin \phi' \cos D - b \sin D$$

$$v' = a \lambda \sin D$$

$$m \sin M = p - u$$

$$n \sin N = p' - u'$$

$$m \cos M = q - v$$

$$n \cos N = q' - v'$$

$$\log k = 9.4350$$

$$\cos \psi = \frac{m \sin (M - N)}{k}$$

$$Q = 90^\circ - N \mp \psi$$

$$t = -\frac{m}{n} \cos (M - N) \mp \frac{k \sin \psi}{n}$$

Upper signs for Immersion ; under signs for Emersion.

$$c \sin C = u + t u'$$

$$c \cos C = v + t v'$$

$$V = Q + C$$

Mean solar time of the star's apparent contact with the moon's limb

$$= T - d + t$$

$$\text{Angle from North Point} = Q$$

$$\text{Angle from Vertex} = V$$

The angle  $\psi$  is to be taken out positive and less than  $180^\circ$ . If  $\log m \sin (M - N)$  be greater than  $\log k$ ,  $\cos \psi$  will evidently be greater than 1, or impossible, and there will be no occultation, except in some rare instances where the moon's limb passes very close to the star, when  $\log \cos \psi$  will result very near 0. In these cases, a recalculation should be made according to the method which follows, using

$$t = -\frac{m}{n} \cos (M - N),$$

which may give  $\log m \sin (M - N)$  less than  $\log k$ , when the star will be occulted. On the other hand, it may happen that, in these cases of very near approach, a first determination may give a  $\cos \psi$  less than 1, which a recalculation will show to be impossible. The angle  $\psi$  is then to be considered  $= 0^\circ$  when  $m \sin (M - N)$  is positive, and we shall have  $Q = 90^\circ - N$ . When  $m \sin (M - N)$  is negative,  $\psi = 180^\circ$ , or  $Q = 90^\circ - N + 180^\circ = 270^\circ - N$ . We shall also have, at the time of nearest approach,

$$\text{star's distance from moon's limb} = \pi (m \sin (M - N) - .2723),$$

in which  $\pi$  is the moon's horizontal parallax.

By *Angle from North Point* is to be understood the arc included between the star when in contact, and the point where the limb is intersected by an arc of a great circle passing from the moon's centre to the North Pole ; and by *Angle from Vertex*, the arc between the star at contact, and the point where the limb is intersected by an arc of a great circle passing from the moon's centre to the zenith. These angles are reckoned from the north point and from the vertex towards the *West* round the circumference of the moon's disc. For the image as seen in an inverting telescope, add to them  $180^\circ$ .



The results obtained by the above equations are only approximate, yet the computed times of immersion and emersion will usually be within one or two minutes of the truth. The error generally increases with the star's distance from the apparent path of the moon's centre, and may, in some cases, amount to several minutes. For an immersion, this error is not of much consequence; but for an emersion, especially of a small star, the time should be determined with greater precision. For this purpose  $u'$  and  $v'$  must be computed with

$$h' - d = h - d + \frac{1}{2} \mu,$$

$\mu$  being the symbol by which we express the sidereal equivalent of  $t$  in these equations.

$$\begin{aligned} u' &= r \cos \phi' \lambda \cos (h' - d) \\ v' &= r \cos \phi' \lambda \sin (h' - d) \sin D. \end{aligned}$$

Then with these values of  $u'$  and  $v'$ , recompute  $N$ ,  $n$ ,  $\psi$ , and  $t$ , by means of

$$\begin{aligned} n \sin N &= p' - u' \\ n \cos N &= q' - v' \\ \cos \psi &= \frac{m \sin (M - N)}{k} \\ t &= -\frac{m}{n} \cos (M - N) \mp \frac{k \sin \psi}{n} \end{aligned}$$

using the  $M$  and  $m$  obtained by the first computation, and we shall have the time of contact  $T - d + t$ , generally within a few seconds of the truth.

As a check on the accuracy of the work, we might compute

$$\begin{aligned} u &= r \cos \phi' \sin (h - d + \mu) \\ v &= r \cos \phi' \cos D - r \cos \phi' \cos (h - d + \mu) \end{aligned}$$

and we should have

$$(p + t p' - u)^2 + (q + t q' - v)^2 = k^2 = 0.0741.$$

But if  $m \sin M$ ,  $m \cos M$ ,  $\log n \sin N$ , and  $\log n \cos N$ , have been correctly computed, we shall have the following shorter and more convenient check on the subsequent calculations for the time of contact:

$$(m \sin M + t n \sin N)^2 + (m \cos M + t n \cos N)^2 = k^2 = 0.0741.$$

The elements of computation,  $H$ ,  $Y$ , etc., are given for the instant of the moon's true conjunction with the star in right ascension. It is desirable, however, in computing an occultation for a particular place, to assume a time for the calculation near to the time of the nearest approach of the moon's centre to the star, as seen at that place, and to reduce the elements to this assumed time. This time, for which the nearest tenth of an hour will be sufficiently accurate, will not differ greatly from the time of *apparent* conjunction, as affected by parallax, which may be determined approximately by the following equations. Let  $T - d$  be the time of apparent conjunction; then

$$\begin{aligned} (t) &= \frac{\sin (H - d)}{p' \sec \phi - [9.4027] \cos (H - d)} \\ T - d &= \delta - d + (t). \end{aligned}$$

The elements corresponding to the time  $T - d$  may then be obtained as follows:

$$\begin{aligned} h - d &= H - d + (\mu) \\ p &= (t) p' \\ q &= Y + (t) q' \end{aligned}$$



Where occultations are to be generally observed, as at astronomical stations, either temporary or permanent, the observer will find an advantage in looking over the list and selecting, beforehand, all those which may be visible at his station, by observing if his latitude be included between the *limiting parallels* for any given occultation, if the time ( $T - d$ ) be favorable as regards the absence of daylight, and if the star's hour-angle ( $h - d$ ) be not greater than its semidiurnal arc for the given latitude.

For obtaining the time

$$T - d = \delta - d + (t),$$

it will be well to tabulate the values of

$$(t) = \frac{\sin(H - d)}{p' \sec \phi - [9.4027] \cos(H - d)}$$

for every half-hour of ( $H - d$ ) as far as the greatest semidiurnal arc computed for the latitude of the station with a declination of  $30^\circ$ ; and for all values of  $p'$ , using two decimal figures, from 0.50 to 0.60.

It will also be found advantageous to have tabulated values of

$$u = r \cos \phi' \sin(h - d)$$

$$u' = r \cos \phi' \lambda \cos(h - d)$$

which should be given for every minute (in time) of ( $h - d$ ), from  $0^h$  to  $6^h$ . If ( $h - d$ ) exceeds  $6^h$ , the argument will be  $12^h - (h - d)$ , instead of ( $h - d$ ). It will be seen by the equations that  $u$  will have the same sign as  $\sin(h - d)$ , and that  $u'$  will have the same sign as  $\cos(h - d)$ .

In the equation

$$v = r \sin \phi' \cos D - b \sin D$$

the term  $r \sin \phi' \cos D$  may be tabulated for every tenth minute of declination, from  $0^\circ$  to  $30^\circ$ .

For a practical application of the preceding formulæ, we will make the calculations for an occultation of the star  $\epsilon$  Tauri, January 4, 1860, as it will appear at the Point Hudson, Oregon, in north latitude  $48^\circ 7' = \phi$ , and west longitude from Washington  $3^h 2^m 47^s = d$ . The data for the computation are given on page 404, and, with the latitude and longitude of the place, are as follows:—

January 4.  $\epsilon$  Tauri, 5.

$\phi + 48^\circ 7.0$	$H + 1^h 44^m 58^s$	$\log \sin D + 9.6098$
$d + 3^h 2.8$	$d + 3^h 2^m 47^s$	$\log \cos D + 9.9007$
$\delta 10 26.0$	$H - d - 1^h 17^m 49^s$	$p' 0.5717$
$\delta - d 7 23.2$	$Y + 0.5520$	$q' + 0.1223$

Calculation of the Time,  $T - d$ , and reduction of the elements of computation.

	$\log p' 9.757$		$(t) + 0.5$
	$\log \sec \phi + 0.176$		
$\log p' \sec \phi =$	$\log (1) + 9.933$	(Reduced to hours and minutes)	$(t) - 0^h 30^m 0^s$
	$\log \text{constant } 9.403$	Sidereal equivalent for ( $t$ )	$(\mu) - 0^h 30^m 5^s$
	$\log \cos(H - d) + 9.974$		$H - d - 1^h 17^m 49^s$
$\log [9.403] \cos(H - d) =$	$\log (2) + 9.377$	$H - d + (\mu) =$	$h - d - 1^h 47^m 54^s$
	$(2) + .238$		$\delta - d 7 23.2$
	$(1) + .857$	$\delta - d + (t) =$	$T - d 6 53.2$
$(1) - (2) =$	$(3) + .619$	$(t) p' = 0.5 \times 0.5717 =$	$p - 0.2859$
	$\log (3) + 9.792$	$- 0.5 \times - 0.1223 =$	$Y + 0.5520$
	$\log \sin(H - d) - 9.523$	$Y + (t) q' =$	$(t) q' - 0.0612$
$\log \frac{\sin(H - d)}{(3)} =$	$\log (t) - 9.731$		$q + 0.4908$



Calculation of the times of *Immersion* and *Emersion*, etc.

(Table, page 483, Arg. $\phi$ )	$\log A$	9.9979	$\log m \sin M$	+8.2405	
	$\log \sin \phi$	+9.8719	$\log m \cos M$	+8.7536	
$\log A \sin \phi =$	$\log r \sin \phi'$	+9.8698	$\log \tan M$	+9.4869	
	$\log \cos D$	+9.9607	$\log \cos M$	+9.9805	
	$\log r \sin \phi' \cos D$	+9.8305	$\log m$	+8.7731	
(Table, page 483, Arg. $\phi$ )	$\log B$	0.0008	$\log n \sin N$	+9.6182	
	$\log \cos \phi$	+9.8245	$\log n \cos N$	+9.1895	
$\log B \cos \phi =$	$\log r \cos \phi'$	+9.8253	$\log \tan N$	+0.4287	
	$\log \sin (h-d)$	-9.6566	$\log \sin N$	+9.9718	
$\log r \cos \phi' \sin (h-d) = \log u = \log a$		-9.4819	$\log n$	+9.6464	
	$\log \cos (h-d)$	+9.9500	$-\log \frac{m}{n}$	-9.1267	
$\log r \cos \phi' \cos (h-d) =$	$\log b$	+9.7753	$\log \cos (M-N)$	+9.7843	
	$\log \lambda$	9.4192	$-\log \frac{m}{n} \cos (M-N) =$	$\log (1)$	-8.9110
	$\log \alpha \lambda$	-8.9011	$\log \sin (M-N)$	-9.8996	
	$\log \sin D$	+9.6098	$\log m \sin (M-N)$	-8.6727	
	$\log b \sin D$	+9.3851	$\log k$	9.4350	
$\log \alpha \lambda \sin D =$	$\log v'$	-8.5109	$\log \frac{m \sin (M-N)}{k} =$	$\log \cos \psi$	-9.2377
$\log b \lambda =$	$\log u'$	+9.1945		$\log \sin \psi$	+9.9934
	$r \sin \phi' \cos D$	+ .6769		$\log k \sin \psi$	+9.4284
	$b \sin D$	+ .3428	$\log \frac{k \sin \psi}{n} =$	$\log (2)$	+9.7820
$r \sin \phi' \cos D - b \sin D =$	$v$	+ .4341		(1) -	.0815
	$q$	+ .4908		(2) +	.6053
$q - v =$	$m \cos M$	+ .0567	For Immersion, (1) - (2) =	$t_1$	.6868
	$p$	- .2859	For Emersion, (1) + (2) =	$t_2$	.5238
	$u$	- .3033		$\log t_1$	-9.8369
$p - u =$	$m \sin M$	+ .0174		$\log u'$	+9.1945
	$q'$	+ .1223		$\log t_1 u'$	-9.0314
	$v'$	- .0324		$\log v'$	-8.5109
$q' - v' =$	$n \cos N$	+ .1547		$\log t_1 v'$	+8.3478
	$p'$	+ .5717		$t_1 v'$	+ .0223
	$u'$	+ .1565		$v$	+ .4341
$p' - u' =$	$n \sin N$	+ .4152	$v + t_1 v' =$	$c \cos C$	+ .4564
	$M$	17° 3'		$t_1 u'$	.1075
	$N$	69 34		$u$	- .3033
	$M - N$	307 29	$u + t_1 u' =$	$c \sin C$	.4108
	$90^\circ - N$	20 26		$\log c \sin C$	-9.6136
	$\psi$	99 57		$\log c \cos C$	+9.6594
For Immersion, $90^\circ - N - \psi =$	$Q$	280 29		$\log \tan C$	-9.9542

h. m.  
 $T - d$  6 53.2  
 (Reduced to hours and minutes),  $t_1$  - 0 41.2  
 $T - d + t_1$  6 12.0

IMMERSION: Point Hudson Mean Time, . . . . .

C - 41° 59'  
 Immersion Angle from North Point = . . . . . Q 280 29  
 Immersion Angle from Vertex =  $Q + C =$  . . . . . V 238 30

h. m.  
 (Reduced to hours and minutes),  $t_2$  + 0 31.4  
 $T - d + t_2$  7 24.6

EMERSION: Point Hudson Mean Time, . . . . .







lar coördinates of the satellites corresponding to the time from the next preceding superior conjunction, at intervals of twenty minutes for the first satellite, of forty minutes for the second, of one hour and twenty minutes for the third, and of three hours for the fourth satellite. They are also given for the time of eclipse for the first, second, and third satellites at intervals of seven days, and for the fourth for every eclipse. They enable the astronomer to obtain the configurations at all times. They are given in seconds of arc.

The coördinates have their origin in the centre of the primary, and are referred to the major and minor axes of the apparent ellipse described by the path of the satellite.

The major axis of this ellipse is constant, for the earth's mean place; but the minor axis takes all values from the positive and negative maxima to zero, owing to the changes in the earth's elevation above the plane of the satellite's orbit.

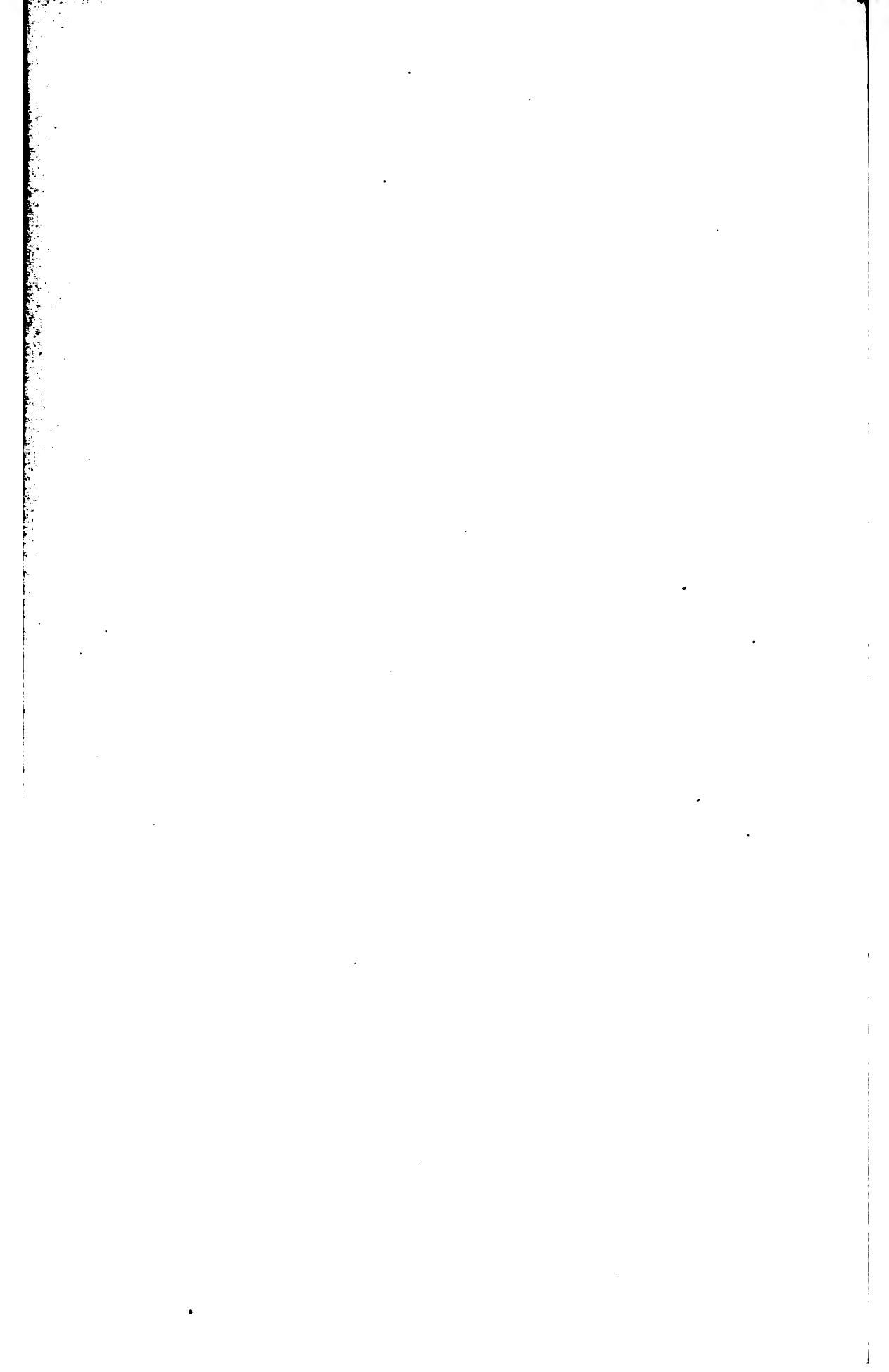
The values in the table correspond to the maximum value of the conjugate axis, as seen from the sun or that of the mean maximum for the earth (which is a constant value). Factors are given in an adjoining column, at intervals of seven days for the first, second, and third satellites, and seventeen days for the fourth, to reduce the above values to those corresponding to the axis for the time being; also for the same intervals, the angle of inclination of the northern semi-minor axis to the circle of declination.

$x$  is positive after superior conjunction, or on the east side of the planet, negative before superior conjunction, or on the west side.  $y$  will be positive north, negative south. The eclipses, occultations, &c. of the satellites, visible at Washington, that is, those which occur when the sun is  $8^\circ$  below and Jupiter  $8^\circ$  above the horizon, are distinguished by a W. placed after the name of the phase.

The *Appendix* contains an article on the construction of this work, similar to that of the preceding year.

It also contains tables of reduction from the equator to the ecliptic, and the reverse; a general table for the Libration of the Moon, constructed by means of the formulas on page 334, and furnishing the values to be employed in the computation of the moon's libration in latitude and longitude (see page 334); a table showing the moon's mean motion in longitude for sidereal intervals of time, carried out to tenths of minutes; a table of logarithms of small arcs in space and time; a table showing the correction required on account of second differences in the moon's motion, the use of which is explained in the preceding part of this article, page 478; a table for converting mean solar into sidereal time, and the reverse; and a table containing the corrections to be applied to the places of Polaris and  $\delta$  Ursæ Minoris in the years 1857, 1858, and 1859, arising from the terms of nutation depending upon 2  $\epsilon$ .

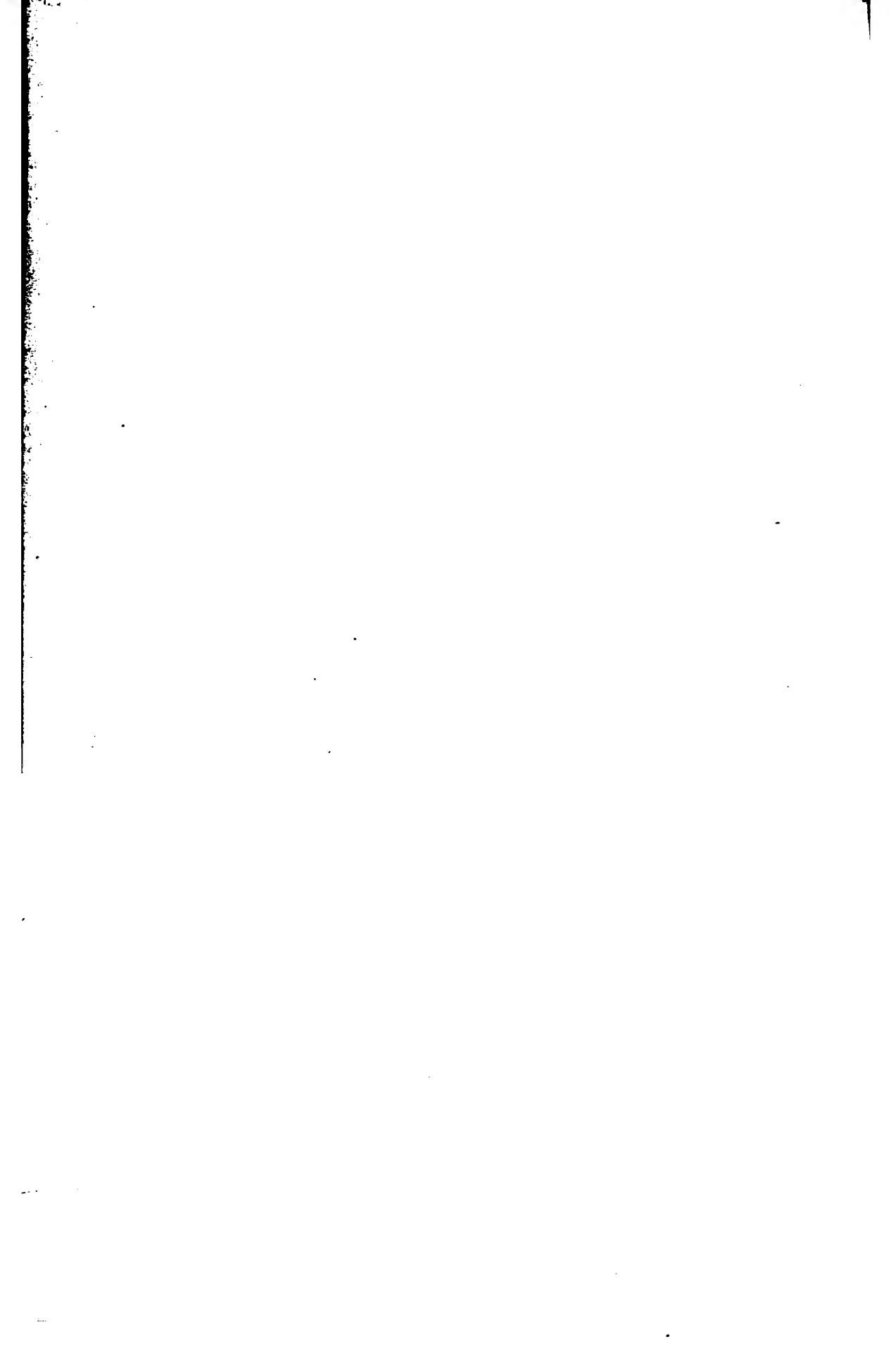






## **A P P E N D I X.**







## CONSTRUCTION OF THE ASTRONOMICAL AND NAUTICAL EPHEMERIDES FOR 1860.

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THE Precession of the Equinoxes adopted in this volume is taken from STRUVE and PETERS; \* it is,

$$\text{Precession} = 50''.2411 + 0''.0002268 t,$$

in which  $t$  is the number of years after 1800.

The Mean Obliquity of the Ecliptic is also taken from STRUVE and PETERS, and its value is, †

$$\text{Obliquity} = 23^\circ 27' 54''.22 - 0''.4645 t - 0''.0000014 t^2.$$

The constant of aberration is that of STRUVE, and is, ‡

$$\text{Aberration} = 20''.4451 \pm 0''.0111.$$

The Nutation of the Apparent Obliquity and the Equation of the Equinoxes are computed from PETERS' formulas given in his *Numerus Constans Nutationis*. § These formulas are reprinted in the volume of this ephemeris for 1855.

Of the Mean Places of 100 Fixed Stars, thirty-three have been taken from LE VERRIER's list of Fundamental Stars, *Annales de l'Observatoire Impériale de Paris*, Vol. II.; nine from a list of Circumpolar Stars prepared by Dr. GOULD, *U. S. Coast Survey Report*, 1855; and the remainder from the list of stars in the *English Nautical Almanac* for 1855, combined with that given in the *Astronomical Observations made during the Year 1846 at the National Observatory, Washington*.

The Apparent Places of the Fixed Stars have been obtained by means of PETERS' formulas, which are given on page 255.

The place of Sirius is corrected by the following formula, given by PETERS, for the variability of its motion in right ascension compared with those of  $\beta$  Orionis,  $\alpha$  Orionis, and Procyon.

$$\text{Variation of right ascension} = 0''.101 + 0''.00072 t + 0''.170 \sin. (u + 92^\circ 18');$$

in which

\* PETERS' *Numerus Constans Nutationis*, p. 71.

† Ibid., pp. 66 and 71.

‡ STRUVE's *Constant de l'Aberration*, p. 47.

§ PETERS' *Numerus Constans Nutationis*, pp. 46-48.



## APPENDIX.

$\omega$  = the eccentric anomaly from the inferior apsis. It is found from the elements,

Mean annual motion of Sirius in its orbit	= $7^{\circ}.3104 \pm 0^{\circ}.2182$
Period of its revolution	= $49^{\circ}.245 \pm 1^{\circ}.456$
Passage through the inferior apsis	= $1792.819 \pm 2^{\circ}.039$
Eccentricity	= $0.5647 \pm 0.0627$ .

The List of Moon-culminating Stars is large, and so arranged in a systematic form as to permit the observer a great range for selection.

The Ephemeris of the Sun is constructed from the Tables of HANSEN and OLUFSEN, Copenhagen, 1853. In the computation of the Sun's Geocentric Coördinates, regard has been had to the sun's latitude; the computation has been made by means of the formulas given in the *Construction of the Almanac for 1855*.

ENCKE's discussion of the Transits of Venus in 1761 and 1769, in his *Der Venusdurchgang von 1769, &c.*, has furnished the standard

Equatorial Horizontal Parallax at the Earth's Mean Distance =  $8''.5776$ .

The Sun's Semidiameter at the Earth's Mean Distance has been taken equal to  $16' 2''$ .

For reducing observations of different observers, the following corrections may be added:—

For Greenwich Mural Circle, H.	+ $0.21$
“ “ “ “ H. B.	— $0.43$
“ “ “ “ F.	— $0.86$
“ “ “ “ E.	+ $0.17$
“ “ “ “ R.	— $0.57$
“ “ “ “ G.	— $0.18$
“ “ “ “ I. H.	— $0.87$
“ “ “ “ D.	— $0.61$
“ “ “ “ W. R.	+ $0.49$
“ “ “ “ P.	— $1.28$
Königsberg Meridian Circle, Bessel	— $1.10$
Dorpat “ “ W. Struve	— $1.36$
Washington Mural Circle, Prof. Coffin	+ $1.00$
“ “ “ Lieut. Page	+ $1.00$
Washington Meridian Circle, Prof. Hubbard	— $0.41$

The Ephemeris of the Moon has been constructed from PEIRCE's *Tables of the Moon*, with the *Tables of the Moon's Parallax*, constructed from WALKER's and ADAMS' formulas, and arranged as a Supplement to the first edition of PEIRCE's *Tables of the Moon*.

The Semidiameter of the Moon at the Earth's Mean Distance is taken to be  $\frac{1}{100}$  part greater than that given by BURCKHARDT, although that given by BURCKHARDT is probably better adapted to the computation of eclipses and occultations.



## CONSTRUCTION OF THE ALMANAC.

The Ephemeris of Mercury has been constructed from the theory of LE VERRIER, published in the *Additions* to the *Connaissance des Temps* for 1848, without any alteration. Manuscript Tables have been computed from LE VERRIER's formulas for this purpose.

The Ephemeris of Venus has been derived from manuscript Tables, constructed from LINDENAU's Tables, in a form similar to that adopted for the Lunar Tables; applying AIRY's Long Equation and the corrections proceeding from the discussion, by the method of Least Squares, of Mr. HUGH BREEN's results contained in his paper on the *Corrections of LINDENAU's Elements of the Orbit of Venus, &c.*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XVIII.; and adopting the secular variations of the elements from LE VERRIER's *Memoir on the Determination of the Secular Inequalities of the Planets*, which appeared in the *Connaissance des Temps* for the year 1844. The following are the corresponding corrected elements, and annual variations for Washington, 1855.0.

$$\begin{aligned} L &= 289^{\circ} 51' 53''.5 \\ \pi &= 129\ 32\ 59.6 + 49''.57459\ t. \\ \Omega &= 75\ 23\ 27.3 + 32.88424\ t. \\ i &= 3\ 23\ 34.6 + 0.04363\ t. \\ e &= 1410''.6847 - 0.11157\ t. \\ n &= 2106641.438 \\ a &= 0.7233323 \end{aligned}$$

The Ephemeris of Mars is derived from manuscript Tables constructed from LINDENAU's Tables in the same manner as the Tables of Venus. Mr. HUGH BREEN's results contained in his paper *On the Corrections of LINDENAU's Elements of Mars*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XX., have also been discussed and applied; and LE VERRIER's secular variations of the elements are likewise adopted. The following are the corresponding corrected elements, and secular variations for Washington, 1855.0.

$$\begin{aligned} L &= 320^{\circ} 13' 33''.71 \\ \pi &= 333\ 23\ 17.80 + 65''.99145\ t. \\ \Omega &= 48\ 25\ 55.18 + 27.68294\ t. \\ i &= 1\ 51\ 2.20 - 0.02141\ t. \\ e &= 19238''.75 + 0.18549\ t. \\ n &= 689050.9023 \\ a &= 1.5236878 \end{aligned}$$

The Ephemeris of Jupiter is derived from manuscript Tables constructed from BOUVARD's Tables, with such changes as were required to make them correspond more nearly to the formulas.

The Ephemeris of Saturn is also derived from manuscript Tables constructed from the Tables of BOUVARD, with changes having the same object. The mass of Jupiter given by BESSEL has been adopted and used.

This mass =  $\frac{1}{1047.879 \pm 0.235}$  of the sun's mass.

The following corrections of the elements have also been introduced for 1859 : —



## APPENDIX.

corr. mean long. for Jan. 1, 1860	= +4".9
corr. long. of node	= -143".4
corr. inclination	= -5".7.

The Ephemeris of Uranus is derived from the elliptical portion of BOUVARD's Tables, with LE VERRIER's corrections and perturbations caused by Jupiter and Saturn, contained in his *Recherches sur les Mouvements de la Planète Herschel (dite Uranus)*, published in the *Connaissance des Temps* for 1849, and also PEIRCE's corrections and perturbations arising from the influence of Neptune,

The combined corrections of the elements deduced by PEIRCE for January 1, 1800, are as follows :—

corr. mean distance	= +0.000942
corr. mean motion	= -1."13560
corr. eccentricity	= -0.0003626
corr. long. of per.	= +8252".4
corr. long. of epoch	= +2575".4.

The Ephemeris of Neptune is derived from PEIRCE's theory and WALKER's orbit.

The eclipses and elongations of Jupiter's Satellites are computed from DAMOISEAU's Tables.

The vertical semidiameters of the Planets are computed from the following alues :—

	Vertical Semidiameter.	Log. Dist.	Authority
Mercury	3.34	0.00	LE VERRIER, <i>Theory of Mercury</i> .
Venus	8.546 ± 0.086	0.00	PEIRCE, from the Washington Observations of 1845 and 1846, made with the mural circle.
Mars	2.842 ± 0.057	0.25	
Jupiter	18.78 ± 0.067	0.70	
Saturn	8.77 ± 0.039	0.95	
Uranus	1.68 ± 0.3	1.30	

To correspond to the apparent semidiameters observed with the Washington mural circle, all the semidiameters, except those of Mercury, computed from these values, must be increased by a constant quantity = 0".57.

The apparent elements of Saturn's Rings are computed from BESSEL's data, except those for BOND's dusky ring.

The elements of the eclipse are adapted to the neat and simple modification of BESSEL's formulas, suggested by T. HENRY SAFFORD, Jr.

The elements adapted to BESSEL's formulas are given for all occultations of stars greater than those of the sixth magnitude.

The Heliocentric Coördinates of the Planets are given for the computation of perturbations, and the following are the values of the masses, that of the Sun being unity :—

Mercury	$\frac{1}{4865751}$	ENCKE, <i>A. N.</i> , No. 443.
Venus	$\frac{1}{390000}$	LE VERRIER, <i>Théor. de Merc.</i> , p. 115.



## CONSTRUCTION OF THE ALMANAC.

The Earth	$\frac{1}{354936}$	LE VERRIER, <i>Théor. de Merc.</i> , p. 26.
Mars	$\frac{1}{2680637}$	BURCKHARDT, <i>Conn. des Temps</i> , 1816, p. 343.
Jupiter	$\frac{1}{1047.879 \pm 0.235}$	BESSEL, <i>Die Masse des Jupiter</i> , p. 64.
Saturn	$\frac{1}{3501.6}$	BESSEL, <i>Comptes Rendus</i> , 1841.
Uranus	$\frac{1}{24905}$	LAMONT, <i>Mem. Ast. Soc.</i> , Vol. XI p. 54.
Neptune	$\frac{1}{18780}$	PEIRCE, <i>Am. Ac. Proc.</i> , Vol. I. p. 333.

The intervals of original computation have in all cases been made sufficiently small to authorize the use of the differences as a check of the accuracy of the work. The results have also been tested, in various portions, by means of duplicate computations. The proofs from the stereotype plates have been thoroughly examined by an independent series of differences. And it is believed that, in every respect, that system has been adopted in which accuracy was most likely to be secured.

The principal computations of the Ephemeris have been distributed in the following manner.

The Sun has been computed by Mr. EASTWOOD. The Moon, with the Culminations and Lunar Distances, has been divided between Mr. RUNKLE, Mr. OLIVER, Mr. LOOMIS, Mr. KEER, Mr. WRIGHT, and T. H. SAFFORD, Jr. Mercury has been computed by Mr. BRADFORD and Mr. NEWCOMB, Venus by Miss MITCHELL, Mars by Mr. BARDWELL and Mr. NEWCOMB, Jupiter by Professor KENDALL, Saturn by Professor VAN VLECK, Uranus by Mr. FERREL, and Neptune by Professor KENDALL. The Fixed Stars have been computed by Mr. SPRAGUE, the General Constants for Reduction by Professor PEIRCE, and the Occultations by Mr. DOWNES. The Eclipses have been computed by Mr. RUNKLE, and the Charts projected by Mr. WRIGHT. The Table of Geographical Positions of the Principal Observatories has been prepared by Dr. GOULD.



# EQUATOR TO ECLIPTIC.

**TABLE FOR CHANGING LATITUDE AND LONGITUDE TO RIGHT ASCENSION AND DECLINATION, OR THE REVERSE.**

<i>k</i>	<i>k</i>	<i>A</i>	<i>a</i>	Diff.	Log. <i>a</i>	Diff.	<i>b</i>	Log. <i>b</i>	<i>B</i>	Diff.	<i>k</i>	<i>k</i>
0	h. m.	0	0.0						0	0.0	h. m.	0
0	0 0	0	0.0	1	9.6000	1	0.9173	9.9625	0	26.0	12 0	180
1	0 4	0	5.4	2	9.5999	2	0.9174	9.9626	0	26.0	11 56	179
2	0 8	0	10.8	3	9.5997	3	0.9175	9.9626	0	52.1	11 52	178
3	0 12	0	16.2	4	9.5994	4	0.9176	9.9627	1	18.1	11 48	177
4	0 16	0	21.5	5	9.5989	5	0.9178	9.9627	1	44.0	11 44	176
5	0 20	0	26.9	7	9.5983	7	0.9180	9.9628	2	9.9	11 40	175
6	0 24	0	32.2	8	9.5976	9	0.9183	9.9630	2	35.8	11 36	174
7	0 28	0	37.4	9	9.5967	10	0.9186	9.9631	3	1.6	11 32	173
8	0 32	0	42.6	10	9.5957	11	0.9190	9.9633	3	27.4	11 28	172
9	0 36	0	47.7	13	9.5946	13	0.9195	9.9635	3	53.0	11 24	171
10	0 40	0	52.8	13	9.5933	14	0.9200	9.9638	4	18.6	11 20	170
11	0 44	0	57.8	13	9.5919	15	0.9205	9.9640	4	44.0	11 16	169
12	0 48	1	2.7	15	9.5904	17	0.9211	9.9643	5	9.3	11 12	168
13	0 52	1	7.5	16	9.5887	18	0.9217	9.9646	5	34.5	11 8	167
14	0 56	1	12.8	17	9.5869	20	0.9224	9.9649	5	59.6	11 4	166
15	1 0	1	17.0	19	9.5849	21	0.9231	9.9652	6	24.5	11 0	165
16	1 4	1	21.5	20	9.5828	22	0.9239	9.9656	6	49.3	10 56	164
17	1 8	1	25.9	21	9.5806	24	0.9247	9.9660	7	13.9	10 52	163
18	1 12	1	30.2	22	9.5782	25	0.9256	9.9664	7	38.3	10 48	162
19	1 16	1	34.4	23	9.5757	27	0.9265	9.9668	8	2.5	10 44	161
20	1 20	1	38.5	24	9.5730	29	0.9274	9.9678	8	26.5	10 40	160
21	1 24	1	42.4	26	9.5701	30	0.9284	9.9677	8	50.4	10 36	159
22	1 28	1	46.2	27	9.5671	31	0.9294	9.9682	9	14.0	10 32	158
23	1 32	1	49.9	27	9.5640	33	0.9304	9.9687	9	37.4	10 28	157
24	1 36	1	53.4	29	9.5607	35	0.9315	9.9692	10	0.6	10 24	156
25	1 40	1	56.7	30	9.5572	36	0.9326	9.9697	10	23.5	10 20	155
26	1 44	1	59.9	31	9.5536	38	0.9338	9.9708	10	46.2	10 16	154
27	1 48	2	2.9	32	9.5498	39	0.9350	9.9708	11	8.7	10 12	153
28	1 52	2	5.8	33	9.5459	41	0.9362	9.9714	11	30.9	10 8	152
29	1 56	2	8.5	34	9.5418	43	0.9374	9.9719	11	52.8	10 4	151
30	2 0	2	11.1	35	9.5375	45	0.9387	9.9725	12	14.5	10 0	150
31	2 4	2	13.5	37	9.5330	46	0.9400	9.9731	12	35.9	9 56	149
32	2 8	2	15.7	38	9.5284	48	0.9413	9.9737	12	57.0	9 52	148
33	2 12	2	17.7	38	9.5236	51	0.9426	9.9748	13	17.8	9 48	147
34	2 16	2	19.6	39	9.5185	52	0.9440	9.9750	13	38.4	9 44	146
35	2 20	2	21.3	40	9.5133	54	0.9453	9.9756	13	58.6	9 40	145
36	2 24	2	22.8	41	9.5079	56	0.9467	9.9762	14	18.6	9 36	144
37	2 28	2	24.1	43	9.5023	58	0.9481	9.9768	14	38.2	9 32	143
38	2 32	2	25.2	44	9.4965	60	0.9495	9.9775	14	57.5	9 28	142
39	2 36	2	26.2	44	9.4905	63	0.9509	9.9781	15	16.5	9 24	141
40	2 40	2	27.0	45	9.4842	65	0.9524	9.9788	15	35.1	9 20	140
41	2 44	2	27.6	46	9.4777	67	0.9538	9.9794	15	53.5	9 16	139
42	2 48	2	28.0	47	9.4710	69	0.9552	9.9801	16	11.5	9 12	138
43	2 52	2	28.2	47	9.4641	72	0.9566	9.9807	16	29.2	9 8	137
44	2 56	2	28.2	49	9.4569	74	0.9581	9.9814	16	46.5	9 4	136
45	3 0	2	28.1	50	9.4495	78	0.9595	9.9820	17	3.5	9 0	135
46	3 4	2	27.8	50	9.4417	80	0.9610	9.9827	17	20.2	8 56	134
47	3 8	2	27.3	51	9.4337	82	0.9625	9.9834	17	36.5	8 52	133
48	3 12	2	26.6	52	9.4255	86	0.9639	9.9840	17	52.4	8 48	132
49	3 16	2	25.8	53	9.4169	89	0.9653	9.9847	18	8.0	8 44	131
50	3 20	2	24.8	54	9.4080	92	0.9667	9.9853	18	23.3	8 40	130
51	3 24	2	23.6	54	9.3988	95	0.9681	9.9859	18	38.2	8 36	129
52	3 28	2	22.2	55	9.3893	99	0.9695	9.9865	18	52.7	8 32	128
53	3 32	2	20.7	56	9.3794	102	0.9709	9.9872	19	6.9	8 28	127
54	3 36	2	19.0	57	9.3692	106	0.9722	9.9878	19	20.7	8 24	126
55	3 40	2	17.1	57	9.3586	111	0.9736	9.9884	19	34.1	8 20	125



# EQUATOR TO ECLIPTIC.

**TABLE FOR CHANGING LATITUDE AND LONGITUDE TO RIGHT ASCENSION AND DECLINATION, OR THE REVERSE.**

<i>k</i>	<i>k</i>	<i>A</i>	<i>a</i>	Diff.	Log. <i>a</i>	Diff.	<i>b</i>	Log. <i>b</i>	<i>B</i>	Diff.	<i>k</i>	<i>k</i>
°	h. m.	°							°		h. m.	°
56	3 44	2 15.1	0.2226	58	9.3475	114	0.9749	9.9890	19 47.2	12.7	8 16	124
57	3 48	2 13.0	0.2168	59	9.3361	119	0.9762	9.9895	19 59.9	12.3	8 11	123
58	3 52	2 10.7	0.2109	59	9.3242	124	0.9775	9.9901	20 12.2	12.0	8 8	122
59	3 56	2 8.2	0.2050	60	9.3118	129	0.9788	9.9907	20 24.2	11.6	8 4	121
60	4 0	2 5.6	0.1990	60	9.2989	134	0.9800	9.9912	20 35.8	11.2	8 0	120
61	4 4	2 2.8	0.1930	61	9.2855	139	0.9812	9.9918	20 47.0	10.9	7 56	119
62	4 8	1 59.9	0.1896	62	9.2716	146	0.9824	9.9923	20 57.9	10.4	7 52	118
63	4 12	1 56.9	0.1807	62	9.2570	152	0.9836	9.9928	21 8.3	10.1	7 48	117
64	4 16	1 53.7	0.1745	63	9.2418	159	0.9847	9.9933	21 18.4	9.7	7 44	116
65	4 20	1 50.4	0.1682	63	9.2259	166	0.9858	9.9938	21 28.1	9.4	7 40	115
66	4 24	1 47.0	0.1619	64	9.2093	175	0.9868	9.9942	21 37.5	8.9	7 36	114
67	4 28	1 43.5	0.1555	64	9.1918	183	0.9878	9.9947	21 46.4	8.6	7 32	113
68	4 32	1 39.8	0.1491	64	9.1735	192	0.9888	9.9951	21 55.0	8.2	7 28	112
69	4 36	1 36.1	0.1427	65	9.1543	203	0.9898	9.9955	22 3.2	7.9	7 24	111
70	4 40	1 32.2	0.1362	66	9.1340	214	0.9907	9.9959	22 11.1	7.4	7 20	110
71	4 44	1 28.2	0.1296	66	9.1126	227	0.9916	9.9963	22 18.5	7.1	7 16	109
72	4 48	1 24.2	0.1230	66	9.0899	240	0.9924	9.9967	22 25.6	6.7	7 12	108
73	4 52	1 20.0	0.1164	67	9.0659	256	0.9932	9.9970	22 32.3	6.3	7 8	107
74	4 56	1 15.7	0.1097	67	9.0403	273	0.9940	9.9974	22 38.6	5.9	7 4	106
75	5 0	1 11.4	0.1030	67	9.0130	294	0.9947	9.9977	22 44.5	5.6	7 0	105
76	5 4	1 7.0	0.0963	67	8.9836	315	0.9954	9.9980	22 50.1	5.1	6 56	104
77	5 8	1 2.5	0.0896	68	8.9521	342	0.9960	9.9982	22 55.2	4.8	6 52	103
78	5 12	0 58.0	0.0828	68	8.9179	373	0.9966	9.9985	23 0.0	4.4	6 48	102
79	5 16	0 53.4	0.0760	69	8.8806	410	0.9971	9.9987	23 4.4	4.0	6 41	101
80	5 20	0 48.7	0.0696	68	8.8396	453	0.9976	9.9990	23 8.4	3.6	6 40	100
81	5 24	0 44.0	0.0623	69	8.7943	508	0.9981	9.9992	23 12.0	3.3	6 36	99
82	5 28	0 39.2	0.0554	69	8.7435	576	0.9985	9.9993	23 15.3	2.8	6 32	98
83	5 32	0 34.4	0.0485	69	8.6859	667	0.9988	9.9995	23 18.1	2.5	6 28	97
84	5 36	0 29.6	0.0416	69	8.6192	789	0.9991	9.9996	23 20.6	2.1	6 24	96
85	5 40	0 24.7	0.0347	69	8.5403	967	0.9994	9.9997	23 22.7	1.7	6 20	95
86	5 44	0 19.8	0.0278	69	8.4436	1248	0.9996	9.9998	23 24.4	1.3	6 16	94
87	5 48	0 14.9	0.0209	70	8.3188	1760	0.9998	9.9999	23 25.7	1.0	6 12	93
88	5 52	0 9.9	0.0139	69	8.1428	3010	0.9999	0.0000	23 26.7	0.6	6 8	92
89	5 56	0 5.0	0.0070	70	7.8418		1.0000	0.0000	23 27.3	0.2	6 4	91
90	6 0	0 0.0	0.0000				1.0000	0.0000	23 27.5		6 0	90

This table is computed for an obliquity of 23° 27' 30".

The argument *k* is either the longitude or the right ascension, or their excess above 180° or 12h.

Right ascension (*α*) and declination (*δ*) are converted into longitude (*λ*) and latitude (*β*) by the formulæ

$$k = \alpha \text{ or } \alpha - 12^h$$

$$\tan. p = \alpha \tan. (\delta - B)$$

$$\tan. \beta = b \tan. (\delta - B) \cos. p$$

$$\lambda = \alpha + A + p$$

in which the sign of *α* is that of cos. *α*

the sign of *B* is that of sin. *α*

the sign of *A* is that of tan. *α*

Longitude (*λ*) and latitude (*β*) are converted into right ascension and declination by the formulæ

$$k = \lambda = \lambda - 180^\circ$$

$$\tan. g = \alpha \tan. (\beta + B)$$

$$\tan. \delta = b \tan. (\beta + B) \cos. g$$

$$\alpha = \lambda + A - g$$

in which the sign of *α* is that of cos. *λ*

the sign of *B* is that of sin. *λ*

the sign of *A* is that of tan. *λ*

The following approximate formulæ can be used when *β* is less than 10°.

$$\beta = b (\delta - B)$$

$$\lambda = \alpha + A + \alpha (\delta - B) \sec. \beta$$

and the factor sec. *β* can be neglected when *β* is less than 4°.



# MOON'S LIBRATION.

TABLE FOR THE LIBRATION OF THE MOON.

$\Omega - \lambda$	$\Delta \lambda$	$a$	$B$	$\Omega - \lambda$	$\Omega - \lambda$	$\Delta \lambda$	$a$	$B$	$\Omega - \lambda$
0	0.0	39	0 0.0	180	46	0.6	56	1 3.9	134
1	0.0	39	0 1.6	179	47	0.6	57	1 4.9	133
2	0.0	39	0 3.1	178	48	0.6	58	1 6.0	132
3	0.1	39	0 4.7	177	49	0.6	59	1 7.0	131
4	0.1	39	0 6.2	176	50	0.6	60	1 8.0	130
5	0.1	39	0 7.7	175	51	0.6	62	1 9.0	129
6	0.2	39	0 9.3	174	52	0.6	63	1 10.0	128
7	0.2	39	0 10.8	173	53	0.5	64	1 10.9	127
8	0.2	39	0 12.4	172	54	0.5	66	1 11.8	126
9	0.2	39	0 13.9	171	55	0.5	67	1 12.7	125
10	0.2	39	0 15.4	170	56	0.5	69	1 13.6	124
11	0.3	39	0 16.9	169	57	0.5	71	1 14.5	123
12	0.3	40	0 18.5	168	58	0.5	73	1 15.3	122
13	0.3	40	0 20.0	167	59	0.5	75	1 16.1	121
14	0.3	40	0 21.5	166	60	0.5	77	1 16.9	120
15	0.3	40	0 23.0	165	61	0.5	80	1 17.6	119
16	0.3	40	0 24.5	164	62	0.5	83	1 18.4	118
17	0.3	40	0 26.0	163	63	0.5	86	1 19.1	117
18	0.3	41	0 27.4	162	64	0.5	89	1 19.8	116
19	0.4	41	0 28.9	161	65	0.4	92	1 20.4	115
20	0.4	41	0 30.4	160	66	0.4	95	1 21.1	114
21	0.4	41	0 31.8	159	67	0.4	99	1 21.7	113
22	0.4	42	0 33.2	158	68	0.4	103	1 22.3	112
23	0.4	42	0 34.7	157	69	0.4	108	1 22.9	111
24	0.4	42	0 36.1	156	70	0.4	113	1 23.4	110
25	0.4	43	0 37.5	155	71	0.4	119	1 23.9	109
26	0.5	43	0 38.9	154	72	0.4	125	1 24.4	108
27	0.5	43	0 40.3	153	73	0.4	132	1 24.9	107
28	0.5	44	0 41.7	152	74	0.3	141	1 25.3	106
29	0.5	44	0 43.1	151	75	0.3	150	1 25.7	105
30	0.5	45	0 44.4	150	76	0.3	160	1 26.1	104
31	0.5	45	0 45.7	149	77	0.3	172	1 26.5	103
32	0.5	46	0 47.0	148	78	0.2	186	1 26.8	102
33	0.5	46	0 48.4	147	79	0.2	202	1 27.1	101
34	0.5	47	0 49.7	146	80	0.2	222	1 27.4	100
35	0.5	47	0 51.0	145	81	0.2	247	1 27.7	99
36	0.5	48	0 52.2	144	82	0.2	278	1 27.9	98
37	0.5	48	0 53.4	143	83	0.1	318	1 28.1	97
38	0.6	49	0 54.7	142	84	0.1	370	1 28.3	96
39	0.6	50	0 55.9	141	85	0.1	440	1 28.5	95
40	0.6	50	0 57.1	140	86	0.1	555	1 28.6	94
41	0.6	51	0 58.3	139	87	0.1	740	1 28.7	93
42	0.6	52	0 59.4	138	88	0.0	1110	1 28.7	92
43	0.6	53	1 0.6	137	89	0.0	2220	1 28.8	91
44	0.6	54	1 1.7	136	90	0.0	$\infty$	1 28.8	90
45	0.6	55	1 2.8	135					

$\Delta \lambda$  has the sign of  $\tan. (\Omega - \lambda)$   
 $a$  has the sign of  $\cos. (\Omega - \lambda)$   
 $B$  has the sign of  $\sin. (\Omega - \lambda)$

When  $\Omega - \lambda$  exceeds  $180^\circ$  the table is to be entered with  $(\Omega - \lambda) - 180^\circ$  as the argument in the column  $\Omega - \lambda$ .



# MOON'S MEAN MOTION.

MOON'S MEAN MOTION IN LONGITUDE FOR SIDEREAL INTERVALS.					
Day.	C's Motion in Longitude.	Minutes.	C's Motion in Longitude.	Minutes.	C's Motion in Longitude.
1	0 13 8.4	1	0.5	30	16.4
2	26 16.9	2	1.1	31	17.0
3	39 25.3	3	1.6	32	17.5
4	52 33.7	4	2.2	33	18.1
5	65 42.1	5	2.7	34	18.6
				35	19.2
6	78 50.6	6	3.3	36	19.7
7	91 59.0	7	3.8	37	20.3
8	105 7.4	8	4.4	38	20.8
9	118 15.8	9	4.9	39	21.4
10	131 24.3	10	5.5	40	21.9
Hour.		11	6.0	41	22.4
1	0 32.9	12	6.6	42	23.0
2	1 5.7	13	7.1	43	23.5
3	1 38.6	14	7.7	44	24.1
		15	8.2	45	24.6
4	2 11.3	16	8.8	46	25.2
5	2 44.3	17	9.3	47	25.7
6	3 17.1	18	9.9	48	26.3
7	3 50.0	19	10.4	49	26.8
8	4 22.8	20	11.0	50	27.4
9	4 55.7	21	11.5	51	27.9
10	5 28.5	22	12.0	52	28.5
11	6 1.4	23	12.5	53	29.0
12	6 34.2	24	13.1	54	29.6
13	7 7.1	25	13.6	55	30.1
14	7 39.9	26	14.2	56	30.7
15	8 12.8	27	14.7	57	31.3
16	8 45.6	28	15.3	58	31.8
17	9 18.5	29	15.9	59	32.3
18	9 51.3	30	16.4	60	32.9
19	10 24.2			Seconds.	
20	10 57.0			10	0.1
21	11 29.9			20	0.2
22	12 2.7			30	0.3
23	12 35.6			40	0.4
24	13 8.4			50	0.5
				60	0.5



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0° 0' 0"		0.0000	0.3010	0.4771	0.6021	0.6990	0.7782	0.8451	0.9031	0.9542
0 10	1.0000	1.0414	1.0792	1.1139	1.1461	1.1761	1.2041	1.2304	1.2553	1.2788
0 20	1.3010	1.3222	1.3424	1.3617	1.3802	1.3979	1.4150	1.4314	1.4472	1.4624
0 30	1.4771	1.4914	1.5051	1.5185	1.5315	1.5441	1.5563	1.5682	1.5798	1.5911
0 40	1.6021	1.6128	1.6232	1.6335	1.6435	1.6532	1.6628	1.6721	1.6812	1.6902
0 50	1.6990	1.7076	1.7160	1.7243	1.7324	1.7404	1.7482	1.7559	1.7634	1.7709
0 1 0	1.7782	1.7853	1.7924	1.7993	1.8062	1.8129	1.8195	1.8261	1.8325	1.8388
0 1 10	1.8451	1.8513	1.8573	1.8633	1.8692	1.8751	1.8808	1.8865	1.8921	1.8976
0 1 20	1.9031	1.9085	1.9138	1.9191	1.9243	1.9294	1.9345	1.9395	1.9445	1.9494
0 1 30	1.9542	1.9589	1.9638	1.9685	1.9731	1.9777	1.9823	1.9868	1.9912	1.9956
0 1 40	2.0000	2.0043	2.0086	2.0128	2.0170	2.0212	2.0253	2.0294	2.0334	2.0374
0 1 50	2.0414	2.0453	2.0492	2.0531	2.0569	2.0607	2.0645	2.0682	2.0719	2.0755
0 2 0	2.0792	2.0828	2.0864	2.0899	2.0934	2.0969	2.1004	2.1038	2.1072	2.1106
0 2 10	2.1139	2.1173	2.1206	2.1239	2.1271	2.1303	2.1335	2.1367	2.1399	2.1430
0 2 20	2.1461	2.1492	2.1523	2.1553	2.1584	2.1614	2.1644	2.1673	2.1703	2.1732
0 2 30	2.1761	2.1790	2.1818	2.1847	2.1875	2.1903	2.1931	2.1959	2.1987	2.2014
0 2 40	2.2041	2.2068	2.2095	2.2122	2.2148	2.2175	2.2201	2.2227	2.2253	2.2279
0 2 50	2.2304	2.2330	2.2355	2.2380	2.2405	2.2430	2.2455	2.2480	2.2504	2.2529
0 3 0	2.2553	2.2577	2.2601	2.2625	2.2648	2.2672	2.2695	2.2718	2.2742	2.2765
0 3 10	2.2788	2.2810	2.2833	2.2856	2.2878	2.2900	2.2923	2.2945	2.2967	2.2989
0 3 20	2.3010	2.3032	2.3054	2.3075	2.3096	2.3118	2.3139	2.3160	2.3181	2.3201
0 3 30	2.3222	2.3243	2.3263	2.3284	2.3304	2.3324	2.3345	2.3365	2.3385	2.3404
0 3 40	2.3424	2.3444	2.3464	2.3483	2.3502	2.3522	2.3541	2.3560	2.3579	2.3598
0 3 50	2.3617	2.3636	2.3655	2.3674	2.3692	2.3711	2.3729	2.3747	2.3766	2.3784
0 4 0	2.3802	2.3820	2.3838	2.3856	2.3874	2.3892	2.3909	2.3927	2.3945	2.3962
0 4 10	2.3979	2.3997	2.4014	2.4031	2.4048	2.4065	2.4082	2.4099	2.4116	2.4133
0 4 20	2.4150	2.4166	2.4183	2.4200	2.4216	2.4232	2.4249	2.4265	2.4281	2.4298
0 4 30	2.4314	2.4330	2.4346	2.4362	2.4378	2.4393	2.4409	2.4425	2.4440	2.4456
0 4 40	2.4472	2.4487	2.4502	2.4518	2.4533	2.4548	2.4564	2.4579	2.4594	2.4609
0 4 50	2.4624	2.4639	2.4654	2.4669	2.4683	2.4698	2.4713	2.4728	2.4742	2.4757
0 5 0	2.4771	2.4786	2.4800	2.4814	2.4829	2.4843	2.4857	2.4871	2.4886	2.4900
0 5 10	2.4914	2.4928	2.4942	2.4955	2.4969	2.4983	2.4997	2.5011	2.5024	2.5038
0 5 20	2.5051	2.5065	2.5079	2.5092	2.5105	2.5119	2.5132	2.5145	2.5159	2.5172
0 5 30	2.5185	2.5198	2.5211	2.5224	2.5237	2.5250	2.5263	2.5276	2.5289	2.5302
0 5 40	2.5315	2.5328	2.5340	2.5353	2.5366	2.5378	2.5391	2.5403	2.5416	2.5428
0 5 50	2.5441	2.5453	2.5465	2.5478	2.5490	2.5502	2.5514	2.5527	2.5539	2.5551
0 6 0	2.5563	2.5575	2.5587	2.5599	2.5611	2.5623	2.5635	2.5647	2.5658	2.5670
0 6 10	2.5682	2.5694	2.5705	2.5717	2.5729	2.5740	2.5752	2.5763	2.5775	2.5786
0 6 20	2.5798	2.5809	2.5821	2.5832	2.5843	2.5855	2.5866	2.5877	2.5888	2.5899
0 6 30	2.5911	2.5922	2.5933	2.5944	2.5955	2.5966	2.5977	2.5988	2.5999	2.6010
0 6 40	2.6021	2.6031	2.6042	2.6053	2.6064	2.6075	2.6085	2.6096	2.6107	2.6117
0 6 50	2.6128	2.6138	2.6149	2.6160	2.6170	2.6180	2.6191	2.6201	2.6212	2.6222
0 7 0	2.6232	2.6243	2.6253	2.6263	2.6274	2.6284	2.6294	2.6304	2.6314	2.6325
0 7 10	2.6335	2.6345	2.6355	2.6365	2.6375	2.6385	2.6395	2.6405	2.6415	2.6425
0 7 20	2.6435	2.6444	2.6454	2.6464	2.6474	2.6484	2.6493	2.6503	2.6513	2.6522
0 7 30	2.6532	2.6542	2.6551	2.6561	2.6571	2.6580	2.6590	2.6599	2.6609	2.6618
0 7 40	2.6628	2.6637	2.6646	2.6656	2.6665	2.6675	2.6684	2.6693	2.6702	2.6712
0 7 50	2.6721	2.6730	2.6739	2.6749	2.6758	2.6767	2.6776	2.6785	2.6794	2.6803
0 8 0	2.6812	2.6821	2.6830	2.6839	2.6848	2.6857	2.6866	2.6875	2.6884	2.6893
0 8 10	2.6902	2.6911	2.6920	2.6928	2.6937	2.6946	2.6955	2.6964	2.6972	2.6981
0 8 20	2.6990	2.6998	2.7007	2.7016	2.7024	2.7033	2.7042	2.7050	2.7059	2.7067
0 8 30	2.7076	2.7084	2.7093	2.7101	2.7110	2.7118	2.7126	2.7135	2.7143	2.7152
0 8 40	2.7160	2.7168	2.7177	2.7185	2.7193	2.7202	2.7210	2.7218	2.7226	2.7235
0 8 50	2.7243	2.7251	2.7259	2.7267	2.7275	2.7284	2.7292	2.7300	2.7308	2.7316
0 9 0	2.7324	2.7332	2.7340	2.7348	2.7356	2.7364	2.7372	2.7380	2.7388	2.7396
0 9 10	2.7404	2.7412	2.7419	2.7427	2.7435	2.7443	2.7451	2.7459	2.7466	2.7474
0 9 20	2.7482	2.7490	2.7497	2.7505	2.7513	2.7520	2.7528	2.7536	2.7543	2.7551
0 9 30	2.7559	2.7566	2.7574	2.7582	2.7589	2.7597	2.7604	2.7612	2.7619	2.7627
0 9 40	2.7634	2.7642	2.7649	2.7657	2.7664	2.7672	2.7679	2.7686	2.7694	2.7701
0 9 50	2.7709	2.7716	2.7723	2.7731	2.7738	2.7745	2.7752	2.7760	2.7767	2.7774



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0° 10' 0"	2.7782	2.7789	2.7796	2.7803	2.7810	2.7818	2.7825	2.7832	2.7839	2.7846
10 10	2.7853	2.7860	2.7868	2.7875	2.7882	2.7889	2.7896	2.7903	2.7910	2.7917
10 20	2.7924	2.7931	2.7938	2.7945	2.7952	2.7959	2.7966	2.7973	2.7980	2.7987
10 30	2.7993	2.8000	2.8007	2.8014	2.8021	2.8028	2.8035	2.8041	2.8048	2.8055
10 40	2.8062	2.8069	2.8075	2.8082	2.8089	2.8096	2.8102	2.8109	2.8116	2.8122
10 50	2.8129	2.8136	2.8142	2.8149	2.8156	2.8162	2.8169	2.8176	2.8182	2.8189
0 11 0	2.8195	2.8202	2.8209	2.8215	2.8222	2.8228	2.8235	2.8241	2.8248	2.8254
11 10	2.8261	2.8267	2.8274	2.8280	2.8287	2.8293	2.8299	2.8306	2.8312	2.8319
11 20	2.8325	2.8331	2.8338	2.8344	2.8351	2.8357	2.8363	2.8370	2.8376	2.8382
11 30	2.8388	2.8395	2.8401	2.8407	2.8414	2.8420	2.8426	2.8432	2.8439	2.8445
11 40	2.8451	2.8457	2.8463	2.8470	2.8476	2.8482	2.8488	2.8494	2.8500	2.8506
11 50	2.8513	2.8519	2.8525	2.8531	2.8537	2.8543	2.8549	2.8555	2.8561	2.8567
0 12 0	2.8573	2.8579	2.8585	2.8591	2.8597	2.8603	2.8609	2.8615	2.8621	2.8627
12 10	2.8633	2.8639	2.8645	2.8651	2.8657	2.8663	2.8669	2.8675	2.8681	2.8686
12 20	2.8692	2.8698	2.8704	2.8710	2.8716	2.8722	2.8727	2.8733	2.8739	2.8745
12 30	2.8751	2.8756	2.8762	2.8768	2.8774	2.8779	2.8785	2.8791	2.8797	2.8802
12 40	2.8808	2.8814	2.8820	2.8825	2.8831	2.8837	2.8842	2.8848	2.8854	2.8859
12 50	2.8865	2.8871	2.8876	2.8882	2.8887	2.8893	2.8899	2.8904	2.8910	2.8915
0 13 0	2.8921	2.8927	2.8932	2.8938	2.8943	2.8949	2.8954	2.8960	2.8965	2.8971
13 10	2.8976	2.8982	2.8987	2.8993	2.8998	2.9004	2.9009	2.9015	2.9020	2.9025
13 20	2.9031	2.9036	2.9042	2.9047	2.9053	2.9058	2.9063	2.9069	2.9074	2.9079
13 30	2.9085	2.9090	2.9096	2.9101	2.9106	2.9112	2.9117	2.9122	2.9128	2.9133
13 40	2.9138	2.9143	2.9149	2.9154	2.9159	2.9165	2.9170	2.9175	2.9180	2.9186
13 50	2.9191	2.9196	2.9201	2.9206	2.9212	2.9217	2.9222	2.9227	2.9232	2.9238
0 14 0	2.9243	2.9248	2.9253	2.9258	2.9263	2.9269	2.9274	2.9279	2.9284	2.9289
14 10	2.9294	2.9299	2.9304	2.9309	2.9315	2.9320	2.9325	2.9330	2.9335	2.9340
14 20	2.9345	2.9350	2.9355	2.9360	2.9365	2.9370	2.9375	2.9380	2.9385	2.9390
14 30	2.9395	2.9400	2.9405	2.9410	2.9415	2.9420	2.9425	2.9430	2.9435	2.9440
14 40	2.9445	2.9450	2.9455	2.9460	2.9465	2.9469	2.9474	2.9479	2.9484	2.9489
14 50	2.9494	2.9499	2.9504	2.9509	2.9513	2.9518	2.9523	2.9528	2.9533	2.9538
0 15 0	2.9542	2.9547	2.9552	2.9557	2.9562	2.9566	2.9571	2.9576	2.9581	2.9586
15 10	2.9590	2.9595	2.9600	2.9605	2.9609	2.9614	2.9619	2.9624	2.9628	2.9633
15 20	2.9638	2.9643	2.9647	2.9652	2.9657	2.9661	2.9666	2.9671	2.9675	2.9680
15 30	2.9685	2.9689	2.9694	2.9699	2.9703	2.9708	2.9713	2.9717	2.9722	2.9727
15 40	2.9731	2.9736	2.9741	2.9745	2.9750	2.9754	2.9759	2.9763	2.9768	2.9773
15 50	2.9777	2.9782	2.9786	2.9791	2.9795	2.9800	2.9805	2.9809	2.9814	2.9818
0 16 0	2.9823	2.9827	2.9832	2.9836	2.9841	2.9845	2.9850	2.9854	2.9859	2.9863
16 10	2.9868	2.9872	2.9877	2.9881	2.9886	2.9890	2.9894	2.9899	2.9903	2.9908
16 20	2.9912	2.9917	2.9921	2.9926	2.9930	2.9934	2.9939	2.9943	2.9948	2.9952
16 30	2.9956	2.9961	2.9965	2.9969	2.9974	2.9978	2.9983	2.9987	2.9991	2.9996
16 40	3.0000	3.0004	3.0009	3.0013	3.0017	3.0022	3.0026	3.0030	3.0035	3.0039
16 50	3.0043	3.0048	3.0052	3.0056	3.0060	3.0065	3.0069	3.0073	3.0077	3.0082
0 17 0	3.0086	3.0090	3.0095	3.0099	3.0103	3.0107	3.0111	3.0116	3.0120	3.0124
17 10	3.0128	3.0133	3.0137	3.0141	3.0145	3.0149	3.0154	3.0158	3.0162	3.0166
17 20	3.0170	3.0175	3.0179	3.0183	3.0187	3.0191	3.0195	3.0199	3.0204	3.0208
17 30	3.0212	3.0216	3.0220	3.0224	3.0228	3.0233	3.0237	3.0241	3.0245	3.0249
17 40	3.0253	3.0257	3.0261	3.0265	3.0269	3.0273	3.0278	3.0282	3.0286	3.0290
17 50	3.0294	3.0298	3.0302	3.0306	3.0310	3.0314	3.0318	3.0322	3.0326	3.0330
0 18 0	3.0334	3.0338	3.0342	3.0346	3.0350	3.0354	3.0358	3.0362	3.0366	3.0370
18 10	3.0374	3.0378	3.0382	3.0386	3.0390	3.0394	3.0398	3.0402	3.0406	3.0410
18 20	3.0414	3.0418	3.0422	3.0426	3.0430	3.0434	3.0438	3.0441	3.0445	3.0449
18 30	3.0453	3.0457	3.0461	3.0465	3.0469	3.0473	3.0477	3.0481	3.0484	3.0488
18 40	3.0492	3.0496	3.0500	3.0504	3.0508	3.0512	3.0515	3.0519	3.0523	3.0527
18 50	3.0531	3.0535	3.0538	3.0542	3.0546	3.0550	3.0554	3.0558	3.0561	3.0565
0 19 0	3.0569	3.0573	3.0577	3.0580	3.0584	3.0588	3.0592	3.0596	3.0599	3.0603
19 10	3.0607	3.0611	3.0615	3.0618	3.0622	3.0626	3.0630	3.0633	3.0637	3.0641
19 20	3.0645	3.0648	3.0652	3.0656	3.0660	3.0663	3.0667	3.0671	3.0674	3.0678
19 30	3.0682	3.0686	3.0689	3.0693	3.0697	3.0700	3.0704	3.0708	3.0711	3.0715
19 40	3.0719	3.0722	3.0726	3.0730	3.0734	3.0737	3.0741	3.0745	3.0748	3.0752
19 50	3.0755	3.0759	3.0763	3.0766	3.0770	3.0774	3.0777	3.0781	3.0785	3.0788



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0° 20' 0"	3.0792	3.0795	3.0799	3.0803	3.0806	3.0810	3.0813	3.0817	3.0821	3.0824
20 10	3.0828	3.0831	3.0835	3.0839	3.0842	3.0846	3.0849	3.0853	3.0856	3.0860
20 20	3.0864	3.0867	3.0871	3.0874	3.0878	3.0881	3.0885	3.0888	3.0892	3.0896
20 30	3.0899	3.0903	3.0906	3.0910	3.0913	3.0917	3.0920	3.0924	3.0927	3.0931
20 40	3.0934	3.0938	3.0941	3.0945	3.0948	3.0952	3.0955	3.0959	3.0962	3.0966
20 50	3.0969	3.0973	3.0976	3.0980	3.0983	3.0986	3.0990	3.0993	3.0997	3.1000
0 21 0	3.1004	3.1007	3.1011	3.1014	3.1017	3.1021	3.1024	3.1028	3.1031	3.1035
21 10	3.1038	3.1041	3.1045	3.1048	3.1052	3.1055	3.1059	3.1062	3.1065	3.1069
21 20	3.1072	3.1075	3.1079	3.1082	3.1086	3.1089	3.1092	3.1096	3.1099	3.1103
21 30	3.1106	3.1109	3.1113	3.1116	3.1119	3.1123	3.1126	3.1129	3.1133	3.1136
21 40	3.1139	3.1143	3.1146	3.1149	3.1153	3.1156	3.1159	3.1163	3.1166	3.1169
21 50	3.1173	3.1176	3.1179	3.1183	3.1186	3.1189	3.1193	3.1196	3.1199	3.1202
0 22 0	3.1206	3.1209	3.1212	3.1216	3.1219	3.1222	3.1225	3.1229	3.1232	3.1235
22 10	3.1239	3.1242	3.1245	3.1248	3.1252	3.1255	3.1258	3.1261	3.1265	3.1268
22 20	3.1271	3.1274	3.1278	3.1281	3.1284	3.1287	3.1290	3.1294	3.1297	3.1300
22 30	3.1303	3.1307	3.1310	3.1313	3.1316	3.1319	3.1323	3.1326	3.1329	3.1332
22 40	3.1335	3.1339	3.1342	3.1345	3.1348	3.1351	3.1355	3.1358	3.1361	3.1364
22 50	3.1367	3.1370	3.1374	3.1377	3.1380	3.1383	3.1386	3.1389	3.1392	3.1396
0 23 0	3.1399	3.1402	3.1405	3.1408	3.1411	3.1414	3.1418	3.1421	3.1424	3.1427
23 10	3.1430	3.1433	3.1436	3.1440	3.1443	3.1446	3.1449	3.1452	3.1455	3.1458
23 20	3.1461	3.1464	3.1467	3.1471	3.1474	3.1477	3.1480	3.1483	3.1486	3.1489
23 30	3.1492	3.1495	3.1498	3.1501	3.1504	3.1508	3.1511	3.1514	3.1517	3.1520
23 40	3.1523	3.1526	3.1529	3.1532	3.1535	3.1538	3.1541	3.1544	3.1547	3.1550
23 50	3.1553	3.1556	3.1559	3.1562	3.1565	3.1569	3.1572	3.1575	3.1578	3.1581
0 24 0	3.1584	3.1587	3.1590	3.1593	3.1596	3.1599	3.1602	3.1605	3.1608	3.1611
24 10	3.1614	3.1617	3.1620	3.1623	3.1626	3.1629	3.1632	3.1635	3.1638	3.1641
24 20	3.1644	3.1647	3.1649	3.1652	3.1655	3.1658	3.1661	3.1664	3.1667	3.1670
24 30	3.1673	3.1676	3.1679	3.1682	3.1685	3.1688	3.1691	3.1694	3.1697	3.1700
24 40	3.1703	3.1706	3.1708	3.1711	3.1714	3.1717	3.1720	3.1723	3.1726	3.1729
24 50	3.1732	3.1735	3.1738	3.1741	3.1744	3.1746	3.1749	3.1752	3.1755	3.1758
0 25 0	3.1761	3.1764	3.1767	3.1770	3.1772	3.1775	3.1778	3.1781	3.1784	3.1787
25 10	3.1790	3.1793	3.1796	3.1798	3.1801	3.1804	3.1807	3.1810	3.1813	3.1816
25 20	3.1818	3.1821	3.1824	3.1827	3.1830	3.1833	3.1836	3.1838	3.1841	3.1844
25 30	3.1847	3.1850	3.1853	3.1855	3.1858	3.1861	3.1864	3.1867	3.1870	3.1872
25 40	3.1875	3.1878	3.1881	3.1884	3.1886	3.1889	3.1892	3.1895	3.1898	3.1901
25 50	3.1903	3.1906	3.1909	3.1912	3.1915	3.1917	3.1920	3.1923	3.1926	3.1928
0 26 0	3.1931	3.1934	3.1937	3.1940	3.1942	3.1945	3.1948	3.1951	3.1953	3.1956
26 10	3.1959	3.1962	3.1965	3.1967	3.1970	3.1973	3.1976	3.1978	3.1981	3.1984
26 20	3.1987	3.1989	3.1992	3.1995	3.1998	3.2000	3.2003	3.2006	3.2009	3.2011
26 30	3.2014	3.2017	3.2019	3.2022	3.2025	3.2028	3.2030	3.2033	3.2036	3.2038
26 40	3.2041	3.2044	3.2047	3.2049	3.2052	3.2055	3.2057	3.2060	3.2063	3.2066
26 50	3.2068	3.2071	3.2074	3.2076	3.2079	3.2082	3.2084	3.2087	3.2090	3.2092
0 27 0	3.2095	3.2098	3.2101	3.2103	3.2106	3.2109	3.2111	3.2114	3.2117	3.2119
27 10	3.2122	3.2125	3.2127	3.2130	3.2133	3.2135	3.2138	3.2140	3.2143	3.2146
27 20	3.2148	3.2151	3.2154	3.2156	3.2159	3.2162	3.2164	3.2167	3.2170	3.2172
27 30	3.2175	3.2177	3.2180	3.2183	3.2185	3.2188	3.2191	3.2193	3.2196	3.2198
27 40	3.2201	3.2204	3.2206	3.2209	3.2212	3.2214	3.2217	3.2219	3.2222	3.2225
27 50	3.2227	3.2230	3.2232	3.2235	3.2238	3.2240	3.2243	3.2245	3.2248	3.2250
0 28 0	3.2253	3.2256	3.2258	3.2261	3.2263	3.2266	3.2269	3.2271	3.2274	3.2276
28 10	3.2279	3.2281	3.2284	3.2287	3.2289	3.2292	3.2294	3.2297	3.2299	3.2302
28 20	3.2304	3.2307	3.2310	3.2312	3.2315	3.2317	3.2320	3.2322	3.2325	3.2327
28 30	3.2330	3.2333	3.2335	3.2338	3.2340	3.2343	3.2345	3.2348	3.2350	3.2353
28 40	3.2355	3.2358	3.2360	3.2363	3.2365	3.2368	3.2370	3.2373	3.2375	3.2378
28 50	3.2380	3.2383	3.2385	3.2388	3.2390	3.2393	3.2395	3.2398	3.2400	3.2403
0 29 0	3.2405	3.2408	3.2410	3.2413	3.2415	3.2418	3.2420	3.2423	3.2425	3.2428
29 10	3.2430	3.2433	3.2435	3.2438	3.2440	3.2443	3.2445	3.2448	3.2450	3.2453
29 20	3.2455	3.2458	3.2460	3.2463	3.2465	3.2467	3.2470	3.2472	3.2475	3.2477
29 30	3.2480	3.2482	3.2485	3.2487	3.2490	3.2492	3.2494	3.2497	3.2499	3.2502
29 40	3.2504	3.2507	3.2509	3.2512	3.2514	3.2516	3.2519	3.2521	3.2524	3.2526
29 50	3.2529	3.2531	3.2533	3.2536	3.2538	3.2541	3.2543	3.2545	3.2548	3.2550



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0° 30' 0"	3.2553	3.2555	3.2558	3.2560	3.2562	3.2565	3.2567	3.2570	3.2572	3.2574
30 10	3.2577	3.2579	3.2582	3.2584	3.2586	3.2589	3.2591	3.2594	3.2596	3.2598
30 20	3.2601	3.2603	3.2605	3.2608	3.2610	3.2613	3.2615	3.2617	3.2620	3.2622
30 30	3.2625	3.2627	3.2629	3.2632	3.2634	3.2636	3.2639	3.2641	3.2643	3.2646
30 40	3.2648	3.2651	3.2653	3.2655	3.2658	3.2660	3.2662	3.2665	3.2667	3.2669
30 50	3.2672	3.2674	3.2676	3.2679	3.2681	3.2683	3.2686	3.2688	3.2690	3.2693
0 31 0	3.2695	3.2697	3.2700	3.2702	3.2704	3.2707	3.2709	3.2711	3.2714	3.2716
31 10	3.2718	3.2721	3.2723	3.2725	3.2728	3.2730	3.2732	3.2735	3.2737	3.2739
31 20	3.2742	3.2744	3.2746	3.2749	3.2751	3.2753	3.2755	3.2758	3.2760	3.2762
31 30	3.2765	3.2767	3.2769	3.2772	3.2774	3.2776	3.2778	3.2781	3.2783	3.2785
31 40	3.2788	3.2790	3.2792	3.2794	3.2797	3.2799	3.2801	3.2804	3.2806	3.2808
31 50	3.2810	3.2813	3.2815	3.2817	3.2819	3.2822	3.2824	3.2826	3.2828	3.2831
0 32 0	3.2833	3.2835	3.2838	3.2840	3.2842	3.2844	3.2847	3.2849	3.2851	3.2853
32 10	3.2856	3.2858	3.2860	3.2862	3.2865	3.2867	3.2869	3.2871	3.2874	3.2876
32 20	3.2878	3.2880	3.2882	3.2885	3.2887	3.2889	3.2891	3.2894	3.2896	3.2898
32 30	3.2900	3.2903	3.2905	3.2907	3.2909	3.2911	3.2914	3.2916	3.2918	3.2920
32 40	3.2923	3.2925	3.2927	3.2929	3.2931	3.2934	3.2936	3.2938	3.2940	3.2942
32 50	3.2945	3.2947	3.2949	3.2951	3.2953	3.2956	3.2958	3.2960	3.2962	3.2964
0 33 0	3.2967	3.2969	3.2971	3.2973	3.2975	3.2978	3.2980	3.2982	3.2984	3.2986
33 10	3.2989	3.2991	3.2993	3.2995	3.2997	3.2999	3.3002	3.3004	3.3006	3.3008
33 20	3.3010	3.3012	3.3015	3.3017	3.3019	3.3021	3.3023	3.3025	3.3028	3.3030
33 30	3.3032	3.3034	3.3036	3.3038	3.3041	3.3043	3.3045	3.3047	3.3049	3.3051
33 40	3.3054	3.3056	3.3058	3.3060	3.3062	3.3064	3.3066	3.3069	3.3071	3.3073
33 50	3.3075	3.3077	3.3079	3.3081	3.3084	3.3086	3.3088	3.3090	3.3092	3.3094
0 34 0	3.3096	3.3098	3.3101	3.3103	3.3105	3.3107	3.3109	3.3111	3.3113	3.3115
34 10	3.3118	3.3120	3.3122	3.3124	3.3126	3.3128	3.3130	3.3132	3.3134	3.3137
34 20	3.3139	3.3141	3.3143	3.3145	3.3147	3.3149	3.3151	3.3153	3.3156	3.3158
34 30	3.3160	3.3162	3.3164	3.3166	3.3168	3.3170	3.3172	3.3174	3.3176	3.3179
34 40	3.3181	3.3183	3.3185	3.3187	3.3189	3.3191	3.3193	3.3195	3.3197	3.3199
34 50	3.3201	3.3204	3.3206	3.3208	3.3210	3.3212	3.3214	3.3216	3.3218	3.3220
0 35 0	3.3222	3.3224	3.3226	3.3228	3.3230	3.3233	3.3235	3.3237	3.3239	3.3241
35 10	3.3243	3.3245	3.3247	3.3249	3.3251	3.3253	3.3255	3.3257	3.3259	3.3261
35 20	3.3263	3.3265	3.3267	3.3269	3.3272	3.3274	3.3276	3.3278	3.3280	3.3282
35 30	3.3284	3.3286	3.3288	3.3290	3.3292	3.3294	3.3296	3.3298	3.3300	3.3302
35 40	3.3304	3.3306	3.3308	3.3310	3.3312	3.3314	3.3316	3.3318	3.3320	3.3322
35 50	3.3324	3.3326	3.3328	3.3330	3.3332	3.3334	3.3336	3.3339	3.3341	3.3343
0 36 0	3.3345	3.3347	3.3349	3.3351	3.3353	3.3355	3.3357	3.3359	3.3361	3.3363
36 10	3.3365	3.3367	3.3369	3.3371	3.3373	3.3375	3.3377	3.3379	3.3381	3.3383
36 20	3.3385	3.3387	3.3389	3.3391	3.3393	3.3395	3.3397	3.3398	3.3400	3.3402
36 30	3.3404	3.3406	3.3408	3.3410	3.3412	3.3414	3.3416	3.3418	3.3420	3.3422
36 40	3.3424	3.3426	3.3428	3.3430	3.3432	3.3434	3.3436	3.3438	3.3440	3.3442
36 50	3.3444	3.3446	3.3448	3.3450	3.3452	3.3454	3.3456	3.3458	3.3460	3.3462
0 37 0	3.3464	3.3465	3.3467	3.3469	3.3471	3.3473	3.3475	3.3477	3.3479	3.3481
37 10	3.3483	3.3485	3.3487	3.3489	3.3491	3.3493	3.3495	3.3497	3.3499	3.3501
37 20	3.3502	3.3504	3.3506	3.3508	3.3510	3.3512	3.3514	3.3516	3.3518	3.3520
37 30	3.3522	3.3524	3.3526	3.3528	3.3530	3.3531	3.3533	3.3535	3.3537	3.3539
37 40	3.3541	3.3543	3.3545	3.3547	3.3549	3.3551	3.3553	3.3555	3.3556	3.3558
37 50	3.3560	3.3562	3.3564	3.3566	3.3568	3.3570	3.3572	3.3574	3.3576	3.3577
0 38 0	3.3579	3.3581	3.3583	3.3585	3.3587	3.3589	3.3591	3.3593	3.3595	3.3596
38 10	3.3598	3.3600	3.3602	3.3604	3.3606	3.3608	3.3610	3.3612	3.3614	3.3615
38 20	3.3617	3.3619	3.3621	3.3623	3.3625	3.3627	3.3629	3.3630	3.3632	3.3634
38 30	3.3636	3.3638	3.3640	3.3642	3.3644	3.3646	3.3647	3.3649	3.3651	3.3653
38 40	3.3655	3.3657	3.3659	3.3660	3.3662	3.3664	3.3666	3.3668	3.3670	3.3672
38 50	3.3674	3.3675	3.3677	3.3679	3.3681	3.3683	3.3685	3.3687	3.3688	3.3690
0 39 0	3.3692	3.3694	3.3696	3.3698	3.3700	3.3701	3.3703	3.3705	3.3707	3.3709
39 10	3.3711	3.3713	3.3714	3.3716	3.3718	3.3720	3.3722	3.3724	3.3725	3.3727
39 20	3.3729	3.3731	3.3733	3.3735	3.3736	3.3738	3.3740	3.3742	3.3744	3.3746
39 30	3.3747	3.3749	3.3751	3.3753	3.3755	3.3757	3.3758	3.3760	3.3762	3.3764
39 40	3.3766	3.3768	3.3769	3.3771	3.3773	3.3775	3.3777	3.3779	3.3780	3.3782
39 50	3.3784	3.3786	3.3788	3.3789	3.3791	3.3793	3.3795	3.3797	3.3798	3.3800



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0° 40' 0"	3.3802	3.3804	3.3806	3.3808	3.3809	3.3811	3.3813	3.3815	3.3817	3.3818
40 10	3.3820	3.3822	3.3824	3.3826	3.3827	3.3829	3.3831	3.3833	3.3835	3.3836
40 20	3.3838	3.3840	3.3842	3.3844	3.3845	3.3847	3.3849	3.3851	3.3852	3.3854
40 30	3.3856	3.3858	3.3860	3.3861	3.3863	3.3865	3.3867	3.3869	3.3870	3.3872
40 40	3.3874	3.3876	3.3877	3.3879	3.3881	3.3883	3.3885	3.3886	3.3888	3.3890
40 50	3.3892	3.3893	3.3895	3.3897	3.3899	3.3901	3.3902	3.3904	3.3906	3.3908
41 0	3.3909	3.3911	3.3913	3.3915	3.3916	3.3918	3.3920	3.3922	3.3923	3.3925
41 10	3.3927	3.3929	3.3930	3.3932	3.3934	3.3936	3.3938	3.3939	3.3941	3.3943
41 20	3.3945	3.3946	3.3948	3.3950	3.3952	3.3953	3.3955	3.3957	3.3959	3.3960
41 30	3.3962	3.3964	3.3965	3.3967	3.3969	3.3971	3.3972	3.3974	3.3976	3.3978
41 40	3.3979	3.3981	3.3983	3.3985	3.3986	3.3988	3.3990	3.3992	3.3993	3.3995
41 50	3.3997	3.3998	3.4000	3.4002	3.4004	3.4005	3.4007	3.4009	3.4011	3.4012
0 42 0	3.4014	3.4016	3.4017	3.4019	3.4021	3.4023	3.4024	3.4026	3.4028	3.4029
42 10	3.4031	3.4033	3.4035	3.4036	3.4038	3.4040	3.4041	3.4043	3.4045	3.4047
42 20	3.4048	3.4050	3.4052	3.4053	3.4055	3.4057	3.4059	3.4060	3.4062	3.4064
42 30	3.4065	3.4067	3.4069	3.4071	3.4072	3.4074	3.4076	3.4077	3.4079	3.4081
42 40	3.4082	3.4084	3.4086	3.4087	3.4089	3.4091	3.4093	3.4094	3.4096	3.4098
42 50	3.4099	3.4101	3.4103	3.4104	3.4106	3.4108	3.4109	3.4111	3.4113	3.4115
0 43 0	3.4116	3.4118	3.4120	3.4121	3.4123	3.4125	3.4126	3.4128	3.4130	3.4131
43 10	3.4133	3.4135	3.4136	3.4138	3.4140	3.4141	3.4143	3.4145	3.4146	3.4148
43 20	3.4150	3.4151	3.4153	3.4155	3.4156	3.4158	3.4160	3.4161	3.4163	3.4165
43 30	3.4166	3.4168	3.4170	3.4171	3.4173	3.4175	3.4176	3.4178	3.4180	3.4181
43 40	3.4183	3.4185	3.4186	3.4188	3.4190	3.4191	3.4193	3.4195	3.4196	3.4198
43 50	3.4200	3.4201	3.4203	3.4205	3.4206	3.4208	3.4209	3.4211	3.4213	3.4214
0 44 0	3.4216	3.4218	3.4219	3.4221	3.4223	3.4224	3.4226	3.4228	3.4229	3.4231
44 10	3.4232	3.4234	3.4236	3.4237	3.4239	3.4241	3.4242	3.4244	3.4246	3.4247
44 20	3.4249	3.4250	3.4252	3.4254	3.4255	3.4257	3.4259	3.4260	3.4262	3.4263
44 30	3.4265	3.4267	3.4268	3.4270	3.4272	3.4273	3.4275	3.4276	3.4278	3.4280
44 40	3.4281	3.4283	3.4285	3.4286	3.4288	3.4289	3.4291	3.4293	3.4294	3.4296
44 50	3.4298	3.4299	3.4301	3.4302	3.4304	3.4306	3.4307	3.4309	3.4310	3.4312
0 45 0	3.4314	3.4315	3.4317	3.4318	3.4320	3.4322	3.4323	3.4325	3.4326	3.4328
45 10	3.4330	3.4331	3.4333	3.4334	3.4336	3.4338	3.4339	3.4341	3.4342	3.4344
45 20	3.4346	3.4347	3.4349	3.4350	3.4352	3.4354	3.4355	3.4357	3.4358	3.4360
45 30	3.4362	3.4363	3.4365	3.4366	3.4368	3.4370	3.4371	3.4373	3.4374	3.4376
45 40	3.4378	3.4379	3.4381	3.4382	3.4384	3.4385	3.4387	3.4389	3.4390	3.4392
45 50	3.4393	3.4395	3.4396	3.4398	3.4400	3.4401	3.4403	3.4404	3.4406	3.4408
0 46 0	3.4409	3.4411	3.4412	3.4414	3.4415	3.4417	3.4419	3.4420	3.4422	3.4423
46 10	3.4425	3.4426	3.4428	3.4429	3.4431	3.4433	3.4434	3.4436	3.4437	3.4439
46 20	3.4440	3.4442	3.4444	3.4445	3.4447	3.4448	3.4450	3.4451	3.4453	3.4454
46 30	3.4456	3.4458	3.4459	3.4461	3.4462	3.4464	3.4465	3.4467	3.4468	3.4470
46 40	3.4472	3.4473	3.4475	3.4476	3.4478	3.4479	3.4481	3.4482	3.4484	3.4486
46 50	3.4487	3.4489	3.4490	3.4492	3.4493	3.4495	3.4496	3.4498	3.4499	3.4501
0 47 0	3.4502	3.4504	3.4506	3.4507	3.4509	3.4510	3.4512	3.4513	3.4515	3.4516
47 10	3.4518	3.4519	3.4521	3.4522	3.4524	3.4526	3.4527	3.4529	3.4530	3.4532
47 20	3.4533	3.4535	3.4536	3.4538	3.4539	3.4541	3.4542	3.4544	3.4545	3.4547
47 30	3.4548	3.4550	3.4551	3.4553	3.4555	3.4556	3.4558	3.4559	3.4561	3.4562
47 40	3.4564	3.4565	3.4567	3.4568	3.4570	3.4571	3.4573	3.4574	3.4576	3.4577
47 50	3.4579	3.4580	3.4582	3.4583	3.4585	3.4586	3.4588	3.4589	3.4591	3.4592
0 48 0	3.4594	3.4595	3.4597	3.4598	3.4600	3.4601	3.4603	3.4604	3.4606	3.4607
48 10	3.4609	3.4610	3.4612	3.4613	3.4615	3.4616	3.4618	3.4619	3.4621	3.4622
48 20	3.4624	3.4625	3.4627	3.4628	3.4630	3.4631	3.4633	3.4634	3.4636	3.4637
48 30	3.4639	3.4640	3.4642	3.4643	3.4645	3.4646	3.4648	3.4649	3.4651	3.4652
48 40	3.4654	3.4655	3.4657	3.4658	3.4660	3.4661	3.4663	3.4664	3.4666	3.4667
48 50	3.4669	3.4670	3.4672	3.4673	3.4675	3.4676	3.4678	3.4679	3.4681	3.4682
0 49 0	3.4683	3.4685	3.4686	3.4688	3.4689	3.4691	3.4692	3.4694	3.4695	3.4697
49 10	3.4698	3.4700	3.4701	3.4703	3.4704	3.4706	3.4707	3.4709	3.4710	3.4711
49 20	3.4713	3.4714	3.4716	3.4717	3.4719	3.4720	3.4722	3.4723	3.4725	3.4726
49 30	3.4728	3.4729	3.4730	3.4732	3.4733	3.4735	3.4736	3.4738	3.4739	3.4741
49 40	3.4742	3.4744	3.4745	3.4747	3.4748	3.4749	3.4751	3.4752	3.4754	3.4755
49 50	3.4757	3.4758	3.4760	3.4761	3.4763	3.4764	3.4765	3.4767	3.4768	3.4770



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0°-50' 0"	3.4771	3.4773	3.4774	3.4776	3.4777	3.4778	3.4780	3.4781	3.4783	3.4784
50 10	3.4786	3.4787	3.4789	3.4790	3.4791	3.4793	3.4794	3.4796	3.4797	3.4799
50 20	3.4800	3.4802	3.4803	3.4804	3.4806	3.4807	3.4809	3.4810	3.4812	3.4813
50 30	3.4814	3.4816	3.4817	3.4819	3.4820	3.4822	3.4823	3.4824	3.4826	3.4827
50 40	3.4829	3.4830	3.4832	3.4833	3.4834	3.4836	3.4837	3.4839	3.4840	3.4842
50 50	3.4843	3.4844	3.4846	3.4847	3.4849	3.4850	3.4852	3.4853	3.4854	3.4856
0 51 0	3.4857	3.4859	3.4860	3.4861	3.4863	3.4864	3.4866	3.4867	3.4869	3.4870
51 10	3.4871	3.4873	3.4874	3.4876	3.4877	3.4878	3.4880	3.4881	3.4883	3.4884
51 20	3.4886	3.4887	3.4888	3.4890	3.4891	3.4893	3.4894	3.4895	3.4897	3.4898
51 30	3.4900	3.4901	3.4902	3.4904	3.4905	3.4907	3.4908	3.4909	3.4911	3.4912
51 40	3.4914	3.4915	3.4916	3.4918	3.4919	3.4921	3.4922	3.4923	3.4925	3.4926
51 50	3.4928	3.4929	3.4930	3.4932	3.4933	3.4935	3.4936	3.4937	3.4939	3.4940
0 52 0	3.4942	3.4943	3.4944	3.4946	3.4947	3.4949	3.4950	3.4951	3.4953	3.4954
52 10	3.4955	3.4957	3.4958	3.4960	3.4961	3.4962	3.4964	3.4965	3.4967	3.4968
52 20	3.4969	3.4971	3.4972	3.4973	3.4975	3.4976	3.4978	3.4979	3.4980	3.4982
52 30	3.4983	3.4984	3.4986	3.4987	3.4989	3.4990	3.4991	3.4993	3.4994	3.4995
52 40	3.4997	3.4998	3.5000	3.5001	3.5002	3.5004	3.5005	3.5006	3.5008	3.5009
52 50	3.5011	3.5012	3.5013	3.5015	3.5016	3.5017	3.5019	3.5020	3.5022	3.5023
0 53 0	3.5024	3.5026	3.5027	3.5028	3.5030	3.5031	3.5032	3.5034	3.5035	3.5037
53 10	3.5038	3.5039	3.5041	3.5042	3.5043	3.5045	3.5046	3.5047	3.5049	3.5050
53 20	3.5051	3.5053	3.5054	3.5056	3.5057	3.5058	3.5060	3.5061	3.5062	3.5064
53 30	3.5065	3.5066	3.5068	3.5069	3.5070	3.5072	3.5073	3.5075	3.5076	3.5077
53 40	3.5079	3.5080	3.5081	3.5083	3.5084	3.5085	3.5087	3.5088	3.5089	3.5091
53 50	3.5092	3.5093	3.5095	3.5096	3.5097	3.5099	3.5100	3.5101	3.5103	3.5104
0 54 0	3.5105	3.5107	3.5108	3.5109	3.5111	3.5112	3.5113	3.5115	3.5116	3.5117
54 10	3.5119	3.5120	3.5122	3.5123	3.5124	3.5126	3.5127	3.5128	3.5130	3.5131
54 20	3.5132	3.5134	3.5135	3.5136	3.5138	3.5139	3.5140	3.5141	3.5143	3.5144
54 30	3.5145	3.5147	3.5148	3.5149	3.5151	3.5152	3.5153	3.5155	3.5156	3.5157
54 40	3.5159	3.5160	3.5161	3.5163	3.5164	3.5165	3.5167	3.5168	3.5169	3.5171
54 50	3.5172	3.5173	3.5175	3.5176	3.5177	3.5179	3.5180	3.5181	3.5183	3.5184
0 55 0	3.5185	3.5186	3.5188	3.5189	3.5190	3.5192	3.5193	3.5194	3.5196	3.5197
55 10	3.5198	3.5200	3.5201	3.5202	3.5204	3.5205	3.5206	3.5207	3.5209	3.5210
55 20	3.5211	3.5213	3.5214	3.5215	3.5217	3.5218	3.5219	3.5221	3.5222	3.5223
55 30	3.5224	3.5226	3.5227	3.5228	3.5230	3.5231	3.5232	3.5234	3.5235	3.5236
55 40	3.5237	3.5239	3.5240	3.5241	3.5243	3.5244	3.5245	3.5247	3.5248	3.5249
55 50	3.5250	3.5252	3.5253	3.5254	3.5256	3.5257	3.5258	3.5260	3.5261	3.5262
0 56 0	3.5263	3.5265	3.5266	3.5267	3.5269	3.5270	3.5271	3.5272	3.5274	3.5275
56 10	3.5276	3.5278	3.5279	3.5280	3.5281	3.5283	3.5284	3.5285	3.5287	3.5288
56 20	3.5289	3.5290	3.5292	3.5293	3.5294	3.5296	3.5297	3.5298	3.5299	3.5301
56 30	3.5302	3.5303	3.5305	3.5306	3.5307	3.5308	3.5310	3.5311	3.5312	3.5314
56 40	3.5315	3.5316	3.5317	3.5319	3.5320	3.5321	3.5322	3.5324	3.5325	3.5326
56 50	3.5328	3.5329	3.5330	3.5331	3.5333	3.5334	3.5335	3.5336	3.5338	3.5339
0 57 0	3.5340	3.5342	3.5343	3.5344	3.5345	3.5347	3.5348	3.5349	3.5350	3.5352
57 10	3.5353	3.5354	3.5355	3.5357	3.5358	3.5359	3.5361	3.5362	3.5363	3.5364
57 20	3.5366	3.5367	3.5368	3.5369	3.5371	3.5372	3.5373	3.5374	3.5376	3.5377
57 30	3.5378	3.5379	3.5381	3.5382	3.5383	3.5384	3.5386	3.5387	3.5388	3.5390
57 40	3.5391	3.5392	3.5393	3.5395	3.5396	3.5397	3.5398	3.5400	3.5401	3.5402
57 50	3.5403	3.5405	3.5406	3.5407	3.5408	3.5410	3.5411	3.5412	3.5413	3.5415
0 58 0	3.5416	3.5417	3.5418	3.5420	3.5421	3.5422	3.5423	3.5425	3.5426	3.5427
58 10	3.5428	3.5429	3.5431	3.5432	3.5433	3.5434	3.5436	3.5437	3.5438	3.5439
58 20	3.5441	3.5442	3.5443	3.5444	3.5446	3.5447	3.5448	3.5449	3.5451	3.5452
58 30	3.5453	3.5454	3.5456	3.5457	3.5458	3.5459	3.5460	3.5462	3.5463	3.5464
58 40	3.5465	3.5467	3.5468	3.5469	3.5470	3.5472	3.5473	3.5474	3.5475	3.5477
58 50	3.5478	3.5479	3.5480	3.5481	3.5483	3.5484	3.5485	3.5486	3.5488	3.5489
0 59 0	3.5490	3.5491	3.5492	3.5494	3.5495	3.5496	3.5497	3.5499	3.5500	3.5501
59 10	3.5502	3.5504	3.5505	3.5506	3.5507	3.5508	3.5510	3.5511	3.5512	3.5513
59 20	3.5514	3.5516	3.5517	3.5518	3.5519	3.5521	3.5522	3.5523	3.5524	3.5525
59 30	3.5527	3.5528	3.5529	3.5530	3.5532	3.5533	3.5534	3.5535	3.5536	3.5538
59 40	3.5539	3.5540	3.5541	3.5542	3.5544	3.5545	3.5546	3.5547	3.5549	3.5550
59 50	3.5551	3.5552	3.5553	3.5555	3.5556	3.5557	3.5558	3.5559	3.5561	3.5562



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0 0	3.5563	3.5564	3.5565	3.5567	3.5568	3.5569	3.5570	3.5571	3.5573	3.5574
0 10	3.5575	3.5576	3.5577	3.5579	3.5580	3.5581	3.5582	3.5583	3.5585	3.5586
0 20	3.5587	3.5588	3.5589	3.5591	3.5592	3.5593	3.5594	3.5595	3.5597	3.5598
0 30	3.5599	3.5600	3.5601	3.5603	3.5604	3.5605	3.5606	3.5607	3.5609	3.5610
0 40	3.5611	3.5612	3.6013	3.5615	3.5616	3.5617	3.5618	3.5619	3.5621	3.5622
0 50	3.5623	3.5624	3.5625	3.5626	3.5628	3.5629	3.5630	3.5631	3.5632	3.5634
1 1 0	3.5635	3.5636	3.5637	3.5638	3.5640	3.5641	3.5642	3.5643	3.5644	3.5645
1 1 10	3.5647	3.5648	3.5649	3.5650	3.5651	3.5653	3.5654	3.5655	3.5656	3.5657
1 1 20	3.5658	3.5660	3.5661	3.5662	3.5663	3.5664	3.5666	3.5667	3.5668	3.5669
1 1 30	3.5670	3.5671	3.5673	3.5674	3.5675	3.5676	3.5677	3.5678	3.5680	3.5681
1 1 40	3.5682	3.5683	3.5684	3.5686	3.5687	3.5688	3.5689	3.5690	3.5691	3.5693
1 1 50	3.5694	3.5695	3.5696	3.5697	3.5698	3.5700	3.5701	3.5702	3.5703	3.5704
1 2 0	3.5705	3.5707	3.5708	3.5709	3.5710	3.5711	3.5712	3.5714	3.5715	3.5716
1 2 10	3.5717	3.5718	3.5719	3.5721	3.5722	3.5723	3.5724	3.5725	3.5726	3.5728
1 2 20	3.5729	3.5730	3.5731	3.5732	3.5733	3.5735	3.5736	3.5737	3.5738	3.5739
1 2 30	3.5740	3.5741	3.5742	3.5744	3.5745	3.5746	3.5747	3.5748	3.5750	3.5751
1 2 40	3.5752	3.5753	3.5754	3.5755	3.5756	3.5758	3.5759	3.5760	3.5761	3.5762
1 2 50	3.5763	3.5765	3.5766	3.5767	3.5768	3.5769	3.5770	3.5771	3.5773	3.5774
1 3 0	3.5775	3.5776	3.5777	3.5778	3.5780	3.5781	3.5782	3.5783	3.5784	3.5785
1 3 10	3.5786	3.5788	3.5789	3.5790	3.5791	3.5792	3.5793	3.5794	3.5796	3.5797
1 3 20	3.5798	3.5799	3.5800	3.5801	3.5802	3.5804	3.5805	3.5806	3.5807	3.5808
1 3 30	3.5809	3.5810	3.5812	3.5813	3.5814	3.5815	3.5816	3.5817	3.5818	3.5819
1 3 40	3.5821	3.5822	3.5823	3.5824	3.5825	3.5826	3.5827	3.5829	3.5830	3.5831
1 3 50	3.5832	3.5833	3.5834	3.5835	3.5837	3.5838	3.5839	3.5840	3.5841	3.5842
1 4 0	3.5843	3.5844	3.5846	3.5847	3.5848	3.5849	3.5850	3.5851	3.5852	3.5853
1 4 10	3.5855	3.5856	3.5857	3.5858	3.5859	3.5860	3.5861	3.5862	3.5864	3.5865
1 4 20	3.5866	3.5867	3.5868	3.5869	3.5870	3.5871	3.5873	3.5874	3.5875	3.5876
1 4 30	3.5877	3.5878	3.5879	3.5880	3.5882	3.5883	3.5884	3.5885	3.5886	3.5887
1 4 40	3.5888	3.5889	3.5891	3.5892	3.5893	3.5894	3.5895	3.5896	3.5897	3.5898
1 4 50	3.5899	3.5901	3.5902	3.5903	3.5904	3.5905	3.5906	3.5907	3.5908	3.5910
1 5 0	3.5911	3.5912	3.5913	3.5914	3.5915	3.5916	3.5917	3.5918	3.5920	3.5921
1 5 10	3.5922	3.5923	3.5924	3.5925	3.5926	3.5927	3.5928	3.5930	3.5931	3.5932
1 5 20	3.5933	3.5934	3.5935	3.5936	3.5937	3.5938	3.5940	3.5941	3.5942	3.5943
1 5 30	3.5944	3.5945	3.5946	3.5947	3.5948	3.5949	3.5951	3.5952	3.5953	3.5954
1 5 40	3.5955	3.5956	3.5957	3.5958	3.5959	3.5960	3.5962	3.5963	3.5964	3.5965
1 5 50	3.5966	3.5967	3.5968	3.5969	3.5970	3.5971	3.5973	3.5974	3.5975	3.5976
1 6 0	3.5977	3.5978	3.5979	3.5980	3.5981	3.5982	3.5984	3.5985	3.5986	3.5987
1 6 10	3.5988	3.5989	3.5990	3.5991	3.5992	3.5993	3.5994	3.5996	3.5997	3.5998
1 6 20	3.5999	3.6000	3.6001	3.6002	3.6003	3.6004	3.6005	3.6006	3.6008	3.6009
1 6 30	3.6010	3.6011	3.6012	3.6013	3.6014	3.6015	3.6016	3.6017	3.6018	3.6020
1 6 40	3.6021	3.6022	3.6023	3.6024	3.6025	3.6026	3.6027	3.6028	3.6029	3.6030
1 6 50	3.6031	3.6033	3.6034	3.6035	3.6036	3.6037	3.6038	3.6039	3.6040	3.6041
1 7 0	3.6042	3.6043	3.6044	3.6046	3.6047	3.6048	3.6049	3.6050	3.6051	3.6052
1 7 10	3.6053	3.6054	3.6055	3.6056	3.6057	3.6058	3.6060	3.6061	3.6062	3.6063
1 7 20	3.6064	3.6065	3.6066	3.6067	3.6068	3.6069	3.6070	3.6071	3.6072	3.6073
1 7 30	3.6075	3.6076	3.6077	3.6078	3.6079	3.6080	3.6081	3.6082	3.6083	3.6084
1 7 40	3.6085	3.6086	3.6087	3.6088	3.6090	3.6091	3.6092	3.6093	3.6094	3.6095
1 7 50	3.6096	3.6097	3.6098	3.6099	3.6100	3.6101	3.6102	3.6103	3.6104	3.6106
1 8 0	3.6107	3.6108	3.6109	3.6110	3.6111	3.6112	3.6113	3.6114	3.6115	3.6116
1 8 10	3.6117	3.6118	3.6119	3.6120	3.6121	3.6123	3.6124	3.6125	3.6126	3.6127
1 8 20	3.6128	3.6129	3.6130	3.6131	3.6132	3.6133	3.6134	3.6135	3.6136	3.6137
1 8 30	3.6138	3.6139	3.6141	3.6142	3.6143	3.6144	3.6145	3.6146	3.6147	3.6148
1 8 40	3.6149	3.6150	3.6151	3.6152	3.6153	3.6154	3.6155	3.6156	3.6157	3.6158
1 8 50	3.6160	3.6161	3.6162	3.6163	3.6164	3.6165	3.6166	3.6167	3.6168	3.6169
1 9 0	3.6170	3.6171	3.6172	3.6173	3.6174	3.6175	3.6176	3.6177	3.6178	3.6179
1 9 10	3.6180	3.6182	3.6183	3.6184	3.6185	3.6186	3.6187	3.6188	3.6189	3.6190
1 9 20	3.6191	3.6192	3.6193	3.6194	3.6195	3.6196	3.6197	3.6198	3.6199	3.6200
1 9 30	3.6201	3.6202	3.6203	3.6204	3.6206	3.6207	3.6208	3.6209	3.6210	3.6211
1 9 40	3.6212	3.6213	3.6214	3.6215	3.6216	3.6217	3.6218	3.6219	3.6220	3.6221
1 9 50	3.6222	3.6223	3.6224	3.6225	3.6226	3.6227	3.6228	3.6229	3.6230	3.6231



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
1 10 0	3.6232	3.6234	3.6235	3.6236	3.6237	3.6238	3.6239	3.6240	3.6241	3.6242
10 10	3.6243	3.6244	3.6245	3.6246	3.6247	3.6248	3.6249	3.6250	3.6251	3.6252
10 20	3.6253	3.6254	3.6255	3.6256	3.6257	3.6258	3.6259	3.6260	3.6261	3.6262
10 30	3.6263	3.6264	3.6265	3.6266	3.6267	3.6268	3.6269	3.6270	3.6271	3.6272
10 40	3.6274	3.6275	3.6276	3.6277	3.6278	3.6279	3.6280	3.6281	3.6282	3.6283
10 50	3.6284	3.6285	3.6286	3.6287	3.6288	3.6289	3.6290	3.6291	3.6292	3.6293
1 11 0	3.6294	3.6295	3.6296	3.6297	3.6298	3.6299	3.6300	3.6301	3.6302	3.6303
11 10	3.6304	3.6305	3.6306	3.6307	3.6308	3.6309	3.6310	3.6311	3.6312	3.6313
11 20	3.6314	3.6315	3.6316	3.6317	3.6318	3.6319	3.6321	3.6322	3.6323	3.6324
11 30	3.6325	3.6326	3.6327	3.6328	3.6329	3.6330	3.6331	3.6332	3.6333	3.6334
11 40	3.6335	3.6336	3.6337	3.6338	3.6339	3.6340	3.6341	3.6342	3.6343	3.6344
11 50	3.6345	3.6346	3.6347	3.6348	3.6349	3.6350	3.6351	3.6352	3.6353	3.6354
1 12 0	3.6355	3.6356	3.6357	3.6358	3.6359	3.6360	3.6361	3.6362	3.6363	3.6364
12 10	3.6365	3.6366	3.6367	3.6368	3.6369	3.6370	3.6371	3.6372	3.6373	3.6374
12 20	3.6375	3.6376	3.6377	3.6378	3.6379	3.6380	3.6381	3.6382	3.6383	3.6384
12 30	3.6385	3.6386	3.6387	3.6388	3.6389	3.6390	3.6391	3.6392	3.6393	3.6394
12 40	3.6395	3.6396	3.6397	3.6398	3.6399	3.6400	3.6401	3.6402	3.6403	3.6404
12 50	3.6405	3.6406	3.6407	3.6408	3.6409	3.6410	3.6411	3.6412	3.6413	3.6414
1 13 0	3.6415	3.6416	3.6417	3.6418	3.6419	3.6420	3.6421	3.6422	3.6423	3.6424
13 10	3.6425	3.6426	3.6427	3.6428	3.6429	3.6430	3.6431	3.6432	3.6433	3.6434
13 20	3.6435	3.6436	3.6437	3.6438	3.6439	3.6440	3.6441	3.6442	3.6443	3.6444
13 30	3.6445	3.6446	3.6447	3.6448	3.6449	3.6450	3.6451	3.6452	3.6453	3.6454
13 40	3.6455	3.6456	3.6457	3.6458	3.6459	3.6460	3.6461	3.6462	3.6463	3.6464
13 50	3.6465	3.6466	3.6467	3.6468	3.6469	3.6470	3.6471	3.6472	3.6473	3.6474
1 14 0	3.6475	3.6476	3.6477	3.6478	3.6479	3.6480	3.6481	3.6482	3.6483	3.6484
14 10	3.6485	3.6486	3.6487	3.6488	3.6489	3.6490	3.6491	3.6492	3.6493	3.6494
14 20	3.6495	3.6496	3.6497	3.6498	3.6499	3.6500	3.6501	3.6502	3.6503	3.6504
14 30	3.6505	3.6506	3.6507	3.6508	3.6509	3.6510	3.6511	3.6512	3.6513	3.6514
14 40	3.6515	3.6516	3.6517	3.6518	3.6519	3.6520	3.6521	3.6522	3.6523	3.6524
14 50	3.6525	3.6526	3.6527	3.6528	3.6529	3.6530	3.6531	3.6532	3.6533	3.6534
1 15 0	3.6535	3.6536	3.6537	3.6538	3.6539	3.6540	3.6541	3.6542	3.6543	3.6544
15 10	3.6545	3.6546	3.6547	3.6548	3.6549	3.6550	3.6551	3.6552	3.6553	3.6554
15 20	3.6555	3.6556	3.6557	3.6558	3.6559	3.6560	3.6561	3.6562	3.6563	3.6564
15 30	3.6565	3.6566	3.6567	3.6568	3.6569	3.6570	3.6571	3.6572	3.6573	3.6574
15 40	3.6575	3.6576	3.6577	3.6578	3.6579	3.6580	3.6581	3.6582	3.6583	3.6584
15 50	3.6585	3.6586	3.6587	3.6588	3.6589	3.6590	3.6591	3.6592	3.6593	3.6594
1 16 0	3.6595	3.6596	3.6597	3.6598	3.6599	3.6600	3.6601	3.6602	3.6603	3.6604
16 10	3.6605	3.6606	3.6607	3.6608	3.6609	3.6610	3.6611	3.6612	3.6613	3.6614
16 20	3.6615	3.6616	3.6617	3.6618	3.6619	3.6620	3.6621	3.6622	3.6623	3.6624
16 30	3.6625	3.6626	3.6627	3.6628	3.6629	3.6630	3.6631	3.6632	3.6633	3.6634
16 40	3.6635	3.6636	3.6637	3.6638	3.6639	3.6640	3.6641	3.6642	3.6643	3.6644
16 50	3.6645	3.6646	3.6647	3.6648	3.6649	3.6650	3.6651	3.6652	3.6653	3.6654
1 17 0	3.6655	3.6656	3.6657	3.6658	3.6659	3.6660	3.6661	3.6662	3.6663	3.6664
17 10	3.6665	3.6666	3.6667	3.6668	3.6669	3.6670	3.6671	3.6672	3.6673	3.6674
17 20	3.6675	3.6676	3.6677	3.6678	3.6679	3.6680	3.6681	3.6682	3.6683	3.6684
17 30	3.6685	3.6686	3.6687	3.6688	3.6689	3.6690	3.6691	3.6692	3.6693	3.6694
17 40	3.6695	3.6696	3.6697	3.6698	3.6699	3.6700	3.6701	3.6702	3.6703	3.6704
17 50	3.6705	3.6706	3.6707	3.6708	3.6709	3.6710	3.6711	3.6712	3.6713	3.6714
1 18 0	3.6715	3.6716	3.6717	3.6718	3.6719	3.6720	3.6721	3.6722	3.6723	3.6724
18 10	3.6725	3.6726	3.6727	3.6728	3.6729	3.6730	3.6731	3.6732	3.6733	3.6734
18 20	3.6735	3.6736	3.6737	3.6738	3.6739	3.6740	3.6741	3.6742	3.6743	3.6744
18 30	3.6745	3.6746	3.6747	3.6748	3.6749	3.6750	3.6751	3.6752	3.6753	3.6754
18 40	3.6755	3.6756	3.6757	3.6758	3.6759	3.6760	3.6761	3.6762	3.6763	3.6764
18 50	3.6765	3.6766	3.6767	3.6768	3.6769	3.6770	3.6771	3.6772	3.6773	3.6774
1 19 0	3.6775	3.6776	3.6777	3.6778	3.6779	3.6780	3.6781	3.6782	3.6783	3.6784
19 10	3.6785	3.6786	3.6787	3.6788	3.6789	3.6790	3.6791	3.6792	3.6793	3.6794
19 20	3.6795	3.6796	3.6797	3.6798	3.6799	3.6800	3.6801	3.6802	3.6803	3.6804
19 30	3.6805	3.6806	3.6807	3.6808	3.6809	3.6810	3.6811	3.6812	3.6813	3.6814
19 40	3.6815	3.6816	3.6817	3.6818	3.6819	3.6820	3.6821	3.6822	3.6823	3.6824
19 50	3.6825	3.6826	3.6827	3.6828	3.6829	3.6830	3.6831	3.6832	3.6833	3.6834



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
1 20 0	3.6812	3.6813	3.6814	3.6815	3.6816	3.6817	3.6818	3.6819	3.6820	3.6821
20 10	3.6821	3.6822	3.6823	3.6824	3.6825	3.6826	3.6827	3.6828	3.6829	3.6830
20 20	3.6830	3.6831	3.6832	3.6833	3.6834	3.6835	3.6836	3.6837	3.6838	3.6839
20 30	3.6839	3.6840	3.6841	3.6842	3.6843	3.6844	3.6845	3.6846	3.6847	3.6848
20 40	3.6848	3.6849	3.6850	3.6851	3.6852	3.6853	3.6854	3.6855	3.6856	3.6857
20 50	3.6857	3.6858	3.6859	3.6860	3.6861	3.6862	3.6863	3.6864	3.6865	3.6866
1 21 0	3.6866	3.6867	3.6868	3.6869	3.6870	3.6871	3.6872	3.6873	3.6874	3.6875
21 10	3.6875	3.6876	3.6877	3.6878	3.6879	3.6880	3.6881	3.6882	3.6883	3.6884
21 20	3.6884	3.6885	3.6886	3.6887	3.6888	3.6889	3.6890	3.6891	3.6892	3.6893
21 30	3.6893	3.6894	3.6895	3.6896	3.6897	3.6898	3.6899	3.6900	3.6901	3.6902
21 40	3.6902	3.6903	3.6904	3.6905	3.6906	3.6907	3.6908	3.6909	3.6910	3.6911
21 50	3.6911	3.6912	3.6913	3.6914	3.6915	3.6916	3.6917	3.6918	3.6919	3.6920
1 22 0	3.6920	3.6921	3.6922	3.6923	3.6924	3.6925	3.6926	3.6927	3.6928	3.6929
22 10	3.6928	3.6929	3.6930	3.6931	3.6932	3.6933	3.6934	3.6935	3.6936	3.6937
22 20	3.6937	3.6938	3.6939	3.6940	3.6941	3.6942	3.6943	3.6944	3.6945	3.6946
22 30	3.6946	3.6947	3.6948	3.6949	3.6950	3.6951	3.6952	3.6953	3.6954	3.6955
22 40	3.6955	3.6956	3.6957	3.6958	3.6959	3.6960	3.6961	3.6962	3.6963	3.6964
22 50	3.6964	3.6965	3.6966	3.6967	3.6968	3.6969	3.6970	3.6971	3.6972	3.6973
1 23 0	3.6972	3.6973	3.6974	3.6975	3.6976	3.6977	3.6978	3.6979	3.6980	3.6981
23 10	3.6981	3.6982	3.6983	3.6984	3.6985	3.6986	3.6987	3.6988	3.6989	3.6990
23 20	3.6990	3.6991	3.6992	3.6993	3.6994	3.6995	3.6996	3.6997	3.6998	3.6999
23 30	3.6999	3.7000	3.7001	3.7002	3.7003	3.7004	3.7005	3.7006	3.7007	3.7008
23 40	3.7007	3.7008	3.7009	3.7010	3.7011	3.7012	3.7013	3.7014	3.7015	3.7016
23 50	3.7016	3.7017	3.7018	3.7019	3.7020	3.7021	3.7022	3.7023	3.7024	3.7025
1 24 0	3.7024	3.7025	3.7026	3.7027	3.7028	3.7029	3.7030	3.7031	3.7032	3.7033
24 10	3.7033	3.7034	3.7035	3.7036	3.7037	3.7038	3.7039	3.7040	3.7041	3.7042
24 20	3.7042	3.7043	3.7044	3.7045	3.7046	3.7047	3.7048	3.7049	3.7050	3.7051
24 30	3.7050	3.7051	3.7052	3.7053	3.7054	3.7055	3.7056	3.7057	3.7058	3.7059
24 40	3.7059	3.7060	3.7061	3.7062	3.7063	3.7064	3.7065	3.7066	3.7067	3.7068
24 50	3.7067	3.7068	3.7069	3.7070	3.7071	3.7072	3.7073	3.7074	3.7075	3.7076
1 25 0	3.7076	3.7077	3.7078	3.7079	3.7080	3.7081	3.7082	3.7083	3.7084	3.7085
25 10	3.7084	3.7085	3.7086	3.7087	3.7088	3.7089	3.7090	3.7091	3.7092	3.7093
25 20	3.7093	3.7094	3.7095	3.7096	3.7097	3.7098	3.7099	3.7100	3.7101	3.7102
25 30	3.7101	3.7102	3.7103	3.7104	3.7105	3.7106	3.7107	3.7108	3.7109	3.7110
25 40	3.7110	3.7111	3.7112	3.7113	3.7114	3.7115	3.7116	3.7117	3.7118	3.7119
25 50	3.7118	3.7119	3.7120	3.7121	3.7122	3.7123	3.7124	3.7125	3.7126	3.7127
1 26 0	3.7126	3.7127	3.7128	3.7129	3.7130	3.7131	3.7132	3.7133	3.7134	3.7135
26 10	3.7135	3.7136	3.7137	3.7138	3.7139	3.7140	3.7141	3.7142	3.7143	3.7144
26 20	3.7143	3.7144	3.7145	3.7146	3.7147	3.7148	3.7149	3.7150	3.7151	3.7152
26 30	3.7152	3.7153	3.7154	3.7155	3.7156	3.7157	3.7158	3.7159	3.7160	3.7161
26 40	3.7160	3.7161	3.7162	3.7163	3.7164	3.7165	3.7166	3.7167	3.7168	3.7169
26 50	3.7168	3.7169	3.7170	3.7171	3.7172	3.7173	3.7174	3.7175	3.7176	3.7177
1 27 0	3.7177	3.7178	3.7179	3.7180	3.7181	3.7182	3.7183	3.7184	3.7185	3.7186
27 10	3.7185	3.7186	3.7187	3.7188	3.7189	3.7190	3.7191	3.7192	3.7193	3.7194
27 20	3.7193	3.7194	3.7195	3.7196	3.7197	3.7198	3.7199	3.7200	3.7201	3.7202
27 30	3.7202	3.7203	3.7204	3.7205	3.7206	3.7207	3.7208	3.7209	3.7210	3.7211
27 40	3.7210	3.7211	3.7212	3.7213	3.7214	3.7215	3.7216	3.7217	3.7218	3.7219
27 50	3.7218	3.7219	3.7220	3.7221	3.7222	3.7223	3.7224	3.7225	3.7226	3.7227
1 28 0	3.7226	3.7227	3.7228	3.7229	3.7230	3.7231	3.7232	3.7233	3.7234	3.7235
28 10	3.7235	3.7236	3.7237	3.7238	3.7239	3.7240	3.7241	3.7242	3.7243	3.7244
28 20	3.7243	3.7244	3.7245	3.7246	3.7247	3.7248	3.7249	3.7250	3.7251	3.7252
28 30	3.7251	3.7252	3.7253	3.7254	3.7255	3.7256	3.7257	3.7258	3.7259	3.7260
28 40	3.7259	3.7260	3.7261	3.7262	3.7263	3.7264	3.7265	3.7266	3.7267	3.7268
28 50	3.7267	3.7268	3.7269	3.7270	3.7271	3.7272	3.7273	3.7274	3.7275	3.7276
1 29 0	3.7275	3.7276	3.7277	3.7278	3.7279	3.7280	3.7281	3.7282	3.7283	3.7284
29 10	3.7283	3.7284	3.7285	3.7286	3.7287	3.7288	3.7289	3.7290	3.7291	3.7292
29 20	3.7291	3.7292	3.7293	3.7294	3.7295	3.7296	3.7297	3.7298	3.7299	3.7300
29 30	3.7300	3.7301	3.7302	3.7303	3.7304	3.7305	3.7306	3.7307	3.7308	3.7309
29 40	3.7308	3.7309	3.7310	3.7311	3.7312	3.7313	3.7314	3.7315	3.7316	3.7317
29 50	3.7316	3.7317	3.7318	3.7319	3.7320	3.7321	3.7322	3.7323	3.7324	3.7325



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0° 30' 0"	3.7324	3.7325	3.7326	3.7326	3.7327	3.7328	3.7329	3.7330	3.7330	3.7331
30 10	3.7332	3.7333	3.7334	3.7334	3.7335	3.7336	3.7337	3.7338	3.7338	3.7339
30 20	3.7340	3.7341	3.7342	3.7342	3.7343	3.7344	3.7345	3.7346	3.7346	3.7347
30 30	3.7348	3.7349	3.7350	3.7350	3.7351	3.7352	3.7353	3.7354	3.7354	3.7355
30 40	3.7356	3.7357	3.7358	3.7358	3.7359	3.7360	3.7361	3.7362	3.7362	3.7363
30 50	3.7364	3.7365	3.7366	3.7366	3.7367	3.7368	3.7369	3.7370	3.7370	3.7371
1 31 0	3.7372	3.7373	3.7374	3.7374	3.7375	3.7376	3.7377	3.7377	3.7378	3.7379
31 10	3.7380	3.7381	3.7381	3.7382	3.7383	3.7384	3.7385	3.7385	3.7386	3.7387
31 20	3.7388	3.7389	3.7389	3.7390	3.7391	3.7392	3.7393	3.7393	3.7394	3.7395
31 30	3.7396	3.7397	3.7397	3.7398	3.7399	3.7400	3.7400	3.7401	3.7402	3.7403
31 40	3.7404	3.7404	3.7405	3.7406	3.7407	3.7408	3.7408	3.7409	3.7410	3.7411
31 50	3.7412	3.7412	3.7413	3.7414	3.7415	3.7415	3.7416	3.7417	3.7418	3.7419
1 32 0	3.7419	3.7420	3.7421	3.7422	3.7423	3.7423	3.7424	3.7425	3.7426	3.7426
32 10	3.7427	3.7428	3.7429	3.7430	3.7430	3.7431	3.7432	3.7433	3.7434	3.7434
32 20	3.7435	3.7436	3.7437	3.7437	3.7438	3.7439	3.7440	3.7441	3.7441	3.7442
32 30	3.7443	3.7444	3.7444	3.7445	3.7446	3.7447	3.7448	3.7448	3.7449	3.7450
32 40	3.7451	3.7452	3.7452	3.7453	3.7454	3.7455	3.7455	3.7456	3.7457	3.7458
32 50	3.7459	3.7459	3.7460	3.7461	3.7462	3.7463	3.7463	3.7464	3.7465	3.7466
1 33 0	3.7466	3.7467	3.7468	3.7469	3.7469	3.7470	3.7471	3.7472	3.7473	3.7473
33 10	3.7474	3.7475	3.7476	3.7476	3.7477	3.7478	3.7479	3.7480	3.7480	3.7481
33 20	3.7482	3.7483	3.7483	3.7484	3.7485	3.7486	3.7487	3.7487	3.7488	3.7489
33 30	3.7490	3.7490	3.7491	3.7492	3.7493	3.7493	3.7494	3.7495	3.7496	3.7497
33 40	3.7497	3.7498	3.7499	3.7500	3.7500	3.7501	3.7502	3.7503	3.7504	3.7504
33 50	3.7505	3.7506	3.7507	3.7507	3.7508	3.7509	3.7510	3.7510	3.7511	3.7512
1 34 0	3.7513	3.7514	3.7514	3.7515	3.7516	3.7517	3.7517	3.7518	3.7519	3.7520
34 10	3.7520	3.7521	3.7522	3.7523	3.7524	3.7524	3.7525	3.7526	3.7527	3.7527
34 20	3.7528	3.7529	3.7530	3.7530	3.7531	3.7532	3.7533	3.7534	3.7534	3.7535
34 30	3.7536	3.7537	3.7537	3.7538	3.7539	3.7540	3.7540	3.7541	3.7542	3.7543
34 40	3.7543	3.7544	3.7545	3.7546	3.7547	3.7547	3.7548	3.7549	3.7550	3.7550
34 50	3.7551	3.7552	3.7553	3.7553	3.7554	3.7555	3.7556	3.7556	3.7557	3.7558
1 35 0	3.7559	3.7560	3.7560	3.7561	3.7562	3.7563	3.7563	3.7564	3.7565	3.7566
35 10	3.7566	3.7567	3.7568	3.7569	3.7569	3.7570	3.7571	3.7572	3.7572	3.7573
35 20	3.7574	3.7575	3.7575	3.7576	3.7577	3.7578	3.7579	3.7579	3.7580	3.7581
35 30	3.7582	3.7582	3.7583	3.7584	3.7585	3.7585	3.7586	3.7587	3.7588	3.7588
35 40	3.7589	3.7590	3.7591	3.7591	3.7592	3.7593	3.7594	3.7594	3.7595	3.7596
35 50	3.7597	3.7597	3.7598	3.7599	3.7600	3.7600	3.7601	3.7602	3.7603	3.7603
1 36 0	3.7604	3.7605	3.7606	3.7606	3.7607	3.7608	3.7609	3.7609	3.7610	3.7611
36 10	3.7612	3.7613	3.7613	3.7614	3.7615	3.7616	3.7616	3.7617	3.7618	3.7619
36 20	3.7619	3.7620	3.7621	3.7622	3.7622	3.7623	3.7624	3.7625	3.7625	3.7626
36 30	3.7627	3.7628	3.7628	3.7629	3.7630	3.7631	3.7631	3.7632	3.7633	3.7634
36 40	3.7634	3.7635	3.7636	3.7637	3.7637	3.7638	3.7639	3.7640	3.7640	3.7641
36 50	3.7642	3.7643	3.7643	3.7644	3.7645	3.7645	3.7646	3.7647	3.7648	3.7648
1 37 0	3.7649	3.7650	3.7651	3.7651	3.7652	3.7653	3.7654	3.7654	3.7655	3.7656
37 10	3.7657	3.7657	3.7658	3.7659	3.7660	3.7660	3.7661	3.7662	3.7663	3.7663
37 20	3.7664	3.7665	3.7666	3.7666	3.7667	3.7668	3.7669	3.7669	3.7670	3.7671
37 30	3.7672	3.7672	3.7673	3.7674	3.7675	3.7675	3.7676	3.7677	3.7677	3.7678
37 40	3.7679	3.7680	3.7681	3.7681	3.7682	3.7683	3.7683	3.7684	3.7685	3.7686
37 50	3.7686	3.7687	3.7688	3.7689	3.7689	3.7690	3.7691	3.7692	3.7692	3.7693
1 38 0	3.7694	3.7695	3.7695	3.7696	3.7697	3.7697	3.7698	3.7699	3.7700	3.7700
38 10	3.7701	3.7702	3.7703	3.7703	3.7704	3.7705	3.7706	3.7706	3.7707	3.7708
38 20	3.7709	3.7709	3.7710	3.7711	3.7711	3.7712	3.7713	3.7714	3.7714	3.7715
38 30	3.7716	3.7717	3.7717	3.7718	3.7719	3.7720	3.7720	3.7721	3.7722	3.7722
38 40	3.7723	3.7724	3.7725	3.7725	3.7726	3.7727	3.7728	3.7728	3.7729	3.7730
38 50	3.7731	3.7731	3.7732	3.7733	3.7733	3.7734	3.7735	3.7736	3.7736	3.7737
1 39 0	3.7738	3.7739	3.7739	3.7740	3.7741	3.7742	3.7742	3.7743	3.7744	3.7744
39 10	3.7745	3.7746	3.7747	3.7747	3.7748	3.7749	3.7750	3.7750	3.7751	3.7752
39 20	3.7752	3.7753	3.7754	3.7755	3.7755	3.7756	3.7757	3.7758	3.7758	3.7759
39 30	3.7760	3.7760	3.7761	3.7762	3.7763	3.7763	3.7764	3.7765	3.7766	3.7766
39 40	3.7767	3.7768	3.7768	3.7769	3.7770	3.7771	3.7771	3.7772	3.7773	3.7774
39 50	3.7774	3.7775	3.7776	3.7776	3.7777	3.7778	3.7779	3.7779	3.7780	3.7781



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
$1^{\circ} 40' 0''$	3.7782	3.7782	3.7783	3.7784	3.7784	3.7785	3.7786	3.7787	3.7787	3.7788
40 10	3.7789	3.7789	3.7790	3.7791	3.7792	3.7792	3.7793	3.7794	3.7795	3.7795
40 20	3.7796	3.7797	3.7797	3.7798	3.7799	3.7800	3.7800	3.7801	3.7802	3.7802
40 30	3.7803	3.7804	3.7805	3.7805	3.7806	3.7807	3.7807	3.7808	3.7809	3.7810
40 40	3.7810	3.7811	3.7812	3.7813	3.7813	3.7814	3.7815	3.7815	3.7816	3.7817
40 50	3.7818	3.7818	3.7819	3.7820	3.7820	3.7821	3.7822	3.7823	3.7823	3.7824
1 41 0	3.7825	3.7825	3.7826	3.7827	3.7828	3.7828	3.7829	3.7830	3.7830	3.7831
41 10	3.7832	3.7833	3.7833	3.7834	3.7835	3.7835	3.7836	3.7837	3.7838	3.7838
41 20	3.7839	3.7840	3.7840	3.7841	3.7842	3.7843	3.7843	3.7844	3.7845	3.7845
41 30	3.7846	3.7847	3.7848	3.7848	3.7849	3.7850	3.7850	3.7851	3.7852	3.7853
41 40	3.7853	3.7854	3.7855	3.7855	3.7856	3.7857	3.7858	3.7858	3.7859	3.7860
41 50	3.7860	3.7861	3.7862	3.7863	3.7863	3.7864	3.7865	3.7865	3.7866	3.7867
1 42 0	3.7868	3.7868	3.7869	3.7870	3.7870	3.7871	3.7872	3.7872	3.7873	3.7874
42 10	3.7875	3.7875	3.7876	3.7877	3.7877	3.7878	3.7879	3.7880	3.7880	3.7881
42 20	3.7882	3.7882	3.7883	3.7884	3.7885	3.7885	3.7886	3.7887	3.7887	3.7888
42 30	3.7889	3.7889	3.7890	3.7891	3.7892	3.7892	3.7893	3.7894	3.7894	3.7895
42 40	3.7896	3.7897	3.7897	3.7898	3.7899	3.7899	3.7900	3.7901	3.7901	3.7902
42 50	3.7903	3.7904	3.7904	3.7905	3.7906	3.7906	3.7907	3.7908	3.7908	3.7909
1 43 0	3.7910	3.7911	3.7911	3.7912	3.7913	3.7913	3.7914	3.7915	3.7916	3.7916
43 10	3.7917	3.7918	3.7918	3.7919	3.7920	3.7920	3.7921	3.7922	3.7923	3.7923
43 20	3.7924	3.7925	3.7925	3.7926	3.7927	3.7927	3.7928	3.7929	3.7930	3.7930
43 30	3.7931	3.7932	3.7932	3.7933	3.7934	3.7934	3.7935	3.7936	3.7937	3.7937
43 40	3.7938	3.7939	3.7939	3.7940	3.7941	3.7941	3.7942	3.7943	3.7943	3.7944
43 50	3.7945	3.7946	3.7946	3.7947	3.7948	3.7948	3.7949	3.7950	3.7950	3.7951
1 44 0	3.7952	3.7953	3.7953	3.7954	3.7955	3.7955	3.7956	3.7957	3.7957	3.7958
44 10	3.7959	3.7959	3.7960	3.7961	3.7962	3.7962	3.7963	3.7964	3.7964	3.7965
44 20	3.7966	3.7966	3.7967	3.7968	3.7969	3.7969	3.7970	3.7971	3.7971	3.7972
44 30	3.7973	3.7973	3.7974	3.7975	3.7975	3.7976	3.7977	3.7978	3.7978	3.7979
44 40	3.7980	3.7980	3.7981	3.7982	3.7982	3.7983	3.7984	3.7984	3.7985	3.7986
44 50	3.7987	3.7987	3.7988	3.7989	3.7989	3.7990	3.7991	3.7991	3.7992	3.7993
1 45 0	3.7993	3.7994	3.7995	3.7995	3.7996	3.7997	3.7998	3.7998	3.7999	3.8000
45 10	3.8000	3.8001	3.8002	3.8002	3.8003	3.8004	3.8004	3.8005	3.8006	3.8006
45 20	3.8007	3.8008	3.8009	3.8009	3.8010	3.8011	3.8011	3.8012	3.8013	3.8013
45 30	3.8014	3.8015	3.8015	3.8016	3.8017	3.8017	3.8018	3.8019	3.8020	3.8020
45 40	3.8021	3.8022	3.8022	3.8023	3.8024	3.8024	3.8025	3.8026	3.8026	3.8027
45 50	3.8028	3.8028	3.8029	3.8030	3.8030	3.8031	3.8032	3.8033	3.8033	3.8034
1 46 0	3.8035	3.8035	3.8036	3.8036	3.8037	3.8038	3.8039	3.8039	3.8040	3.8041
46 10	3.8041	3.8042	3.8043	3.8043	3.8044	3.8045	3.8045	3.8046	3.8047	3.8048
46 20	3.8048	3.8049	3.8050	3.8050	3.8051	3.8052	3.8052	3.8053	3.8054	3.8054
46 30	3.8055	3.8056	3.8056	3.8057	3.8058	3.8058	3.8059	3.8060	3.8060	3.8061
46 40	3.8062	3.8062	3.8063	3.8064	3.8065	3.8065	3.8066	3.8067	3.8067	3.8068
46 50	3.8069	3.8069	3.8070	3.8071	3.8071	3.8072	3.8073	3.8073	3.8074	3.8075
1 47 0	3.8075	3.8076	3.8077	3.8077	3.8078	3.8079	3.8079	3.8080	3.8081	3.8081
47 10	3.8082	3.8083	3.8083	3.8084	3.8085	3.8085	3.8086	3.8087	3.8088	3.8088
47 20	3.8089	3.8090	3.8090	3.8091	3.8092	3.8092	3.8093	3.8094	3.8094	3.8095
47 30	3.8096	3.8096	3.8097	3.8098	3.8098	3.8099	3.8099	3.8100	3.8101	3.8102
47 40	3.8102	3.8103	3.8104	3.8104	3.8105	3.8106	3.8106	3.8107	3.8108	3.8108
47 50	3.8109	3.8110	3.8110	3.8111	3.8112	3.8112	3.8113	3.8114	3.8114	3.8115
1 48 0	3.8116	3.8116	3.8117	3.8118	3.8118	3.8119	3.8120	3.8120	3.8121	3.8122
48 10	3.8122	3.8123	3.8124	3.8124	3.8125	3.8126	3.8126	3.8127	3.8128	3.8128
48 20	3.8129	3.8130	3.8130	3.8131	3.8132	3.8132	3.8133	3.8134	3.8134	3.8135
48 30	3.8136	3.8136	3.8137	3.8138	3.8138	3.8139	3.8140	3.8140	3.8141	3.8142
48 40	3.8142	3.8143	3.8144	3.8144	3.8145	3.8146	3.8146	3.8147	3.8148	3.8148
48 50	3.8149	3.8150	3.8150	3.8151	3.8152	3.8152	3.8153	3.8154	3.8154	3.8155
1 49 0	3.8156	3.8156	3.8157	3.8158	3.8158	3.8159	3.8160	3.8160	3.8161	3.8162
49 10	3.8162	3.8163	3.8164	3.8164	3.8165	3.8166	3.8166	3.8167	3.8168	3.8168
49 20	3.8169	3.8170	3.8170	3.8171	3.8172	3.8172	3.8173	3.8174	3.8174	3.8175
49 30	3.8176	3.8176	3.8177	3.8178	3.8178	3.8179	3.8180	3.8180	3.8181	3.8182
49 40	3.8182	3.8183	3.8184	3.8184	3.8185	3.8185	3.8186	3.8187	3.8188	3.8188
49 50	3.8189	3.8190	3.8190	3.8191	3.8191	3.8192	3.8193	3.8193	3.8194	3.8195



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
ARC.	0	1	2	3	4	5	6	7	8	9
50 0	3.8195	3.8196	3.8197	3.8197	3.8198	3.8199	3.8199	3.8200	3.8201	3.8201
50 10	3.8202	3.8203	3.8203	3.8204	3.8205	3.8205	3.8206	3.8207	3.8207	3.8208
50 20	3.8209	3.8209	3.8210	3.8211	3.8211	3.8212	3.8213	3.8213	3.8214	3.8214
50 30	3.8215	3.8216	3.8216	3.8217	3.8218	3.8218	3.8219	3.8220	3.8220	3.8221
50 40	3.8222	3.8223	3.8223	3.8224	3.8224	3.8225	3.8226	3.8226	3.8227	3.8228
50 50	3.8229	3.8229	3.8230	3.8230	3.8231	3.8231	3.8232	3.8233	3.8233	3.8234
1 51 0	3.8235	3.8235	3.8236	3.8237	3.8237	3.8238	3.8239	3.8239	3.8240	3.8241
51 10	3.8241	3.8242	3.8243	3.8243	3.8244	3.8245	3.8245	3.8246	3.8246	3.8247
51 20	3.8248	3.8248	3.8249	3.8250	3.8250	3.8251	3.8252	3.8252	3.8253	3.8254
51 30	3.8254	3.8255	3.8256	3.8256	3.8257	3.8258	3.8258	3.8259	3.8259	3.8260
51 40	3.8261	3.8261	3.8262	3.8263	3.8263	3.8264	3.8265	3.8265	3.8266	3.8267
51 50	3.8267	3.8268	3.8269	3.8269	3.8270	3.8270	3.8271	3.8272	3.8272	3.8273
1 52 0	3.8274	3.8274	3.8275	3.8276	3.8276	3.8277	3.8278	3.8278	3.8279	3.8280
52 10	3.8280	3.8281	3.8281	3.8282	3.8283	3.8283	3.8284	3.8285	3.8285	3.8286
52 20	3.8287	3.8287	3.8288	3.8289	3.8289	3.8290	3.8290	3.8291	3.8292	3.8292
52 30	3.8293	3.8294	3.8294	3.8295	3.8296	3.8296	3.8297	3.8298	3.8298	3.8299
52 40	3.8299	3.8300	3.8301	3.8301	3.8302	3.8303	3.8303	3.8304	3.8305	3.8305
52 50	3.8306	3.8307	3.8307	3.8308	3.8308	3.8309	3.8310	3.8310	3.8311	3.8312
1 53 0	3.8312	3.8313	3.8314	3.8314	3.8315	3.8315	3.8316	3.8317	3.8317	3.8318
53 10	3.8319	3.8319	3.8320	3.8321	3.8321	3.8322	3.8323	3.8323	3.8324	3.8324
53 20	3.8325	3.8326	3.8326	3.8327	3.8328	3.8328	3.8329	3.8330	3.8330	3.8331
53 30	3.8331	3.8332	3.8333	3.8333	3.8334	3.8335	3.8335	3.8336	3.8337	3.8337
53 40	3.8338	3.8338	3.8339	3.8340	3.8340	3.8341	3.8342	3.8342	3.8343	3.8344
53 50	3.8344	3.8345	3.8345	3.8346	3.8347	3.8347	3.8348	3.8349	3.8349	3.8350
1 54 0	3.8351	3.8351	3.8352	3.8352	3.8353	3.8354	3.8354	3.8355	3.8356	3.8356
54 10	3.8357	3.8358	3.8358	3.8359	3.8359	3.8360	3.8361	3.8361	3.8362	3.8363
54 20	3.8363	3.8364	3.8365	3.8365	3.8366	3.8366	3.8367	3.8368	3.8368	3.8369
54 30	3.8370	3.8370	3.8371	3.8371	3.8372	3.8373	3.8373	3.8374	3.8375	3.8375
54 40	3.8376	3.8377	3.8377	3.8378	3.8378	3.8379	3.8380	3.8380	3.8381	3.8382
54 50	3.8382	3.8383	3.8383	3.8384	3.8385	3.8385	3.8386	3.8387	3.8387	3.8388
1 55 0	3.8388	3.8389	3.8390	3.8390	3.8391	3.8392	3.8392	3.8393	3.8394	3.8394
55 10	3.8395	3.8395	3.8396	3.8397	3.8397	3.8398	3.8399	3.8399	3.8400	3.8400
55 20	3.8401	3.8402	3.8402	3.8403	3.8404	3.8404	3.8405	3.8405	3.8406	3.8407
55 30	3.8407	3.8408	3.8409	3.8409	3.8410	3.8410	3.8411	3.8412	3.8412	3.8413
55 40	3.8414	3.8414	3.8415	3.8415	3.8416	3.8417	3.8417	3.8418	3.8419	3.8419
55 50	3.8420	3.8420	3.8421	3.8422	3.8422	3.8423	3.8424	3.8424	3.8425	3.8425
1 56 0	3.8426	3.8427	3.8427	3.8428	3.8429	3.8429	3.8430	3.8430	3.8431	3.8432
56 10	3.8432	3.8433	3.8434	3.8434	3.8435	3.8435	3.8436	3.8437	3.8437	3.8438
56 20	3.8439	3.8439	3.8440	3.8440	3.8441	3.8442	3.8442	3.8443	3.8444	3.8444
56 30	3.8445	3.8445	3.8446	3.8447	3.8447	3.8448	3.8448	3.8449	3.8450	3.8450
56 40	3.8451	3.8452	3.8452	3.8453	3.8453	3.8454	3.8455	3.8455	3.8456	3.8457
56 50	3.8457	3.8458	3.8458	3.8459	3.8460	3.8460	3.8461	3.8462	3.8462	3.8463
1 57 0	3.8463	3.8464	3.8465	3.8465	3.8466	3.8466	3.8467	3.8468	3.8468	3.8469
57 10	3.8470	3.8470	3.8471	3.8471	3.8472	3.8473	3.8473	3.8474	3.8474	3.8475
57 20	3.8476	3.8476	3.8477	3.8478	3.8478	3.8479	3.8479	3.8480	3.8481	3.8481
57 30	3.8482	3.8483	3.8483	3.8484	3.8484	3.8485	3.8486	3.8486	3.8487	3.8487
57 40	3.8488	3.8489	3.8489	3.8490	3.8491	3.8491	3.8492	3.8492	3.8493	3.8494
57 50	3.8494	3.8495	3.8495	3.8496	3.8497	3.8497	3.8498	3.8499	3.8499	3.8500
1 58 0	3.8500	3.8501	3.8502	3.8502	3.8503	3.8503	3.8504	3.8505	3.8505	3.8506
58 10	3.8506	3.8507	3.8508	3.8508	3.8509	3.8510	3.8510	3.8511	3.8511	3.8512
58 20	3.8513	3.8513	3.8514	3.8514	3.8515	3.8516	3.8516	3.8517	3.8517	3.8518
58 30	3.8519	3.8519	3.8520	3.8521	3.8521	3.8522	3.8522	3.8523	3.8524	3.8524
58 40	3.8525	3.8525	3.8526	3.8527	3.8527	3.8528	3.8528	3.8529	3.8530	3.8530
58 50	3.8531	3.8532	3.8532	3.8533	3.8533	3.8534	3.8535	3.8535	3.8536	3.8536
1 59 0	3.8537	3.8538	3.8538	3.8539	3.8539	3.8540	3.8541	3.8541	3.8542	3.8542
59 10	3.8543	3.8544	3.8544	3.8545	3.8545	3.8546	3.8547	3.8547	3.8548	3.8549
59 20	3.8549	3.8550	3.8550	3.8551	3.8552	3.8552	3.8553	3.8553	3.8554	3.8555
59 30	3.8555	3.8556	3.8556	3.8557	3.8558	3.8558	3.8559	3.8559	3.8560	3.8561
59 40	3.8561	3.8562	3.8562	3.8563	3.8564	3.8564	3.8565	3.8565	3.8566	3.8567
59 50	3.8567	3.8568	3.8568	3.8569	3.8570	3.8570	3.8571	3.8572	3.8572	3.8573



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.											
Arc.	0	1	2	3	4	5	6	7	8	9	
0° 0' 0"	3.8573	3.8574	3.8575	3.8575	3.8576	3.8576	3.8577	3.8578	3.8578	3.8579	
0 10	3.8579	3.8580	3.8581	3.8581	3.8582	3.8582	3.8583	3.8584	3.8584	3.8585	
0 20	3.8585	3.8586	3.8587	3.8587	3.8588	3.8588	3.8589	3.8590	3.8590	3.8591	
0 30	3.8591	3.8592	3.8593	3.8593	3.8594	3.8594	3.8595	3.8596	3.8596	3.8597	
0 40	3.8597	3.8598	3.8599	3.8599	3.8600	3.8600	3.8601	3.8602	3.8602	3.8603	
0 50	3.8603	3.8604	3.8605	3.8605	3.8606	3.8606	3.8607	3.8608	3.8608	3.8609	
2 1 0	3.8609	3.8610	3.8611	3.8611	3.8612	3.8612	3.8613	3.8614	3.8614	3.8615	
1 10	3.8615	3.8616	3.8617	3.8617	3.8618	3.8618	3.8619	3.8620	3.8620	3.8621	
1 20	3.8621	3.8622	3.8623	3.8623	3.8624	3.8624	3.8625	3.8625	3.8626	3.8627	
1 30	3.8627	3.8628	3.8628	3.8629	3.8630	3.8630	3.8631	3.8631	3.8632	3.8633	
1 40	3.8633	3.8634	3.8634	3.8635	3.8636	3.8636	3.8637	3.8637	3.8638	3.8639	
1 50	3.8639	3.8640	3.8640	3.8641	3.8642	3.8642	3.8643	3.8643	3.8644	3.8645	
2 2 0	3.8645	3.8646	3.8646	3.8647	3.8647	3.8648	3.8649	3.8649	3.8650	3.8650	
2 10	3.8651	3.8652	3.8652	3.8653	3.8653	3.8654	3.8655	3.8655	3.8656	3.8656	
2 20	3.8657	3.8658	3.8658	3.8659	3.8659	3.8660	3.8661	3.8661	3.8662	3.8662	
2 30	3.8663	3.8663	3.8664	3.8665	3.8665	3.8666	3.8666	3.8667	3.8668	3.8668	
2 40	3.8669	3.8669	3.8670	3.8671	3.8671	3.8672	3.8672	3.8673	3.8673	3.8674	
2 50	3.8675	3.8675	3.8676	3.8676	3.8677	3.8677	3.8678	3.8678	3.8679	3.8680	
2 3 0	3.8681	3.8681	3.8682	3.8682	3.8683	3.8684	3.8684	3.8685	3.8685	3.8686	
3 10	3.8686	3.8687	3.8688	3.8688	3.8689	3.8689	3.8690	3.8691	3.8691	3.8692	
3 20	3.8692	3.8693	3.8693	3.8694	3.8695	3.8695	3.8696	3.8696	3.8697	3.8698	
3 30	3.8698	3.8699	3.8699	3.8700	3.8701	3.8701	3.8702	3.8702	3.8703	3.8703	
3 40	3.8704	3.8705	3.8705	3.8706	3.8706	3.8707	3.8708	3.8708	3.8709	3.8709	
3 50	3.8710	3.8710	3.8711	3.8712	3.8712	3.8713	3.8713	3.8714	3.8715	3.8715	
2 4 0	3.8716	3.8716	3.8717	3.8717	3.8718	3.8719	3.8719	3.8720	3.8720	3.8721	
4 10	3.8722	3.8722	3.8723	3.8723	3.8724	3.8724	3.8725	3.8726	3.8726	3.8727	
4 20	3.8727	3.8728	3.8729	3.8729	3.8730	3.8730	3.8731	3.8731	3.8732	3.8733	
4 30	3.8733	3.8734	3.8734	3.8735	3.8736	3.8736	3.8737	3.8737	3.8738	3.8738	
4 40	3.8739	3.8740	3.8740	3.8741	3.8741	3.8742	3.8743	3.8743	3.8744	3.8744	
4 50	3.8745	3.8745	3.8746	3.8747	3.8747	3.8748	3.8748	3.8749	3.8749	3.8750	
2 5 0	3.8751	3.8751	3.8752	3.8752	3.8753	3.8754	3.8754	3.8755	3.8755	3.8756	
5 10	3.8756	3.8757	3.8758	3.8758	3.8759	3.8759	3.8760	3.8760	3.8761	3.8762	
5 20	3.8762	3.8763	3.8763	3.8764	3.8764	3.8765	3.8766	3.8766	3.8767	3.8767	
5 30	3.8768	3.8769	3.8769	3.8770	3.8770	3.8771	3.8771	3.8772	3.8773	3.8773	
5 40	3.8774	3.8774	3.8775	3.8775	3.8776	3.8777	3.8777	3.8778	3.8778	3.8779	
5 50	3.8779	3.8780	3.8781	3.8781	3.8782	3.8782	3.8783	3.8783	3.8784	3.8785	
2 6 0	3.8785	3.8786	3.8786	3.8787	3.8788	3.8788	3.8789	3.8789	3.8790	3.8790	
6 10	3.8791	3.8792	3.8792	3.8793	3.8793	3.8794	3.8794	3.8795	3.8796	3.8796	
6 20	3.8797	3.8797	3.8798	3.8798	3.8799	3.8800	3.8800	3.8801	3.8801	3.8802	
6 30	3.8802	3.8803	3.8804	3.8804	3.8805	3.8805	3.8806	3.8806	3.8807	3.8808	
6 40	3.8808	3.8809	3.8809	3.8810	3.8810	3.8811	3.8812	3.8812	3.8813	3.8813	
6 50	3.8814	3.8814	3.8815	3.8816	3.8816	3.8817	3.8817	3.8818	3.8818	3.8819	
2 7 0	3.8820	3.8820	3.8821	3.8821	3.8822	3.8822	3.8823	3.8824	3.8824	3.8825	
7 10	3.8825	3.8826	3.8826	3.8827	3.8828	3.8828	3.8829	3.8829	3.8830	3.8830	
7 20	3.8831	3.8832	3.8832	3.8833	3.8833	3.8834	3.8834	3.8835	3.8835	3.8836	
7 30	3.8837	3.8837	3.8838	3.8838	3.8839	3.8839	3.8840	3.8841	3.8841	3.8842	
7 40	3.8842	3.8843	3.8843	3.8844	3.8845	3.8845	3.8846	3.8846	3.8847	3.8847	
7 50	3.8848	3.8849	3.8849	3.8850	3.8850	3.8851	3.8851	3.8852	3.8852	3.8853	
2 8 0	3.8854	3.8854	3.8855	3.8855	3.8856	3.8856	3.8857	3.8858	3.8858	3.8859	
8 10	3.8859	3.8860	3.8860	3.8861	3.8862	3.8862	3.8863	3.8863	3.8864	3.8864	
8 20	3.8865	3.8865	3.8866	3.8867	3.8867	3.8868	3.8868	3.8869	3.8869	3.8870	
8 30	3.8871	3.8871	3.8872	3.8872	3.8873	3.8873	3.8874	3.8874	3.8875	3.8876	
8 40	3.8876	3.8877	3.8877	3.8878	3.8878	3.8879	3.8880	3.8880	3.8881	3.8881	
8 50	3.8882	3.8882	3.8883	3.8883	3.8884	3.8885	3.8885	3.8886	3.8886	3.8887	
2 9 0	3.8887	3.8888	3.8889	3.8889	3.8890	3.8890	3.8891	3.8891	3.8892	3.8892	
9 10	3.8893	3.8894	3.8894	3.8895	3.8895	3.8896	3.8896	3.8897	3.8897	3.8898	
9 20	3.8899	3.8899	3.8900	3.8900	3.8901	3.8902	3.8902	3.8903	3.8903	3.8904	
9 30	3.8904	3.8905	3.8905	3.8906	3.8906	3.8907	3.8908	3.8908	3.8909	3.8909	
9 40	3.8910	3.8910	3.8911	3.8911	3.8912	3.8912	3.8913	3.8914	3.8914	3.8915	
9 50	3.8915	3.8916	3.8916	3.8917	3.8918	3.8918	3.8919	3.8919	3.8920	3.8920	



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
2 10 0	3.8921	3.8922	3.8922	3.8923	3.8923	3.8924	3.8924	3.8925	3.8925	3.8926
10 10	3.8927	3.8927	3.8928	3.8928	3.8929	3.8929	3.8930	3.8930	3.8931	3.8932
10 20	3.8932	3.8933	3.8933	3.8934	3.8934	3.8935	3.8935	3.8936	3.8937	3.8937
10 30	3.8938	3.8938	3.8939	3.8939	3.8940	3.8940	3.8941	3.8941	3.8942	3.8943
10 40	3.8943	3.8944	3.8944	3.8945	3.8945	3.8946	3.8946	3.8947	3.8948	3.8948
10 50	3.8949	3.8949	3.8950	3.8950	3.8951	3.8951	3.8952	3.8953	3.8953	3.8954
2 11 0	3.8954	3.8955	3.8955	3.8956	3.8956	3.8957	3.8958	3.8958	3.8959	3.8959
11 10	3.8960	3.8960	3.8961	3.8961	3.8962	3.8963	3.8963	3.8964	3.8964	3.8965
11 20	3.8965	3.8966	3.8966	3.8967	3.8967	3.8968	3.8969	3.8969	3.8970	3.8970
11 30	3.8971	3.8971	3.8972	3.8972	3.8973	3.8974	3.8974	3.8975	3.8975	3.8976
11 40	3.8976	3.8977	3.8977	3.8978	3.8978	3.8979	3.8980	3.8980	3.8981	3.8981
11 50	3.8982	3.8982	3.8983	3.8983	3.8984	3.8985	3.8985	3.8986	3.8986	3.8987
2 12 0	3.8987	3.8988	3.8988	3.8989	3.8989	3.8990	3.8991	3.8991	3.8992	3.8992
12 10	3.8993	3.8993	3.8994	3.8994	3.8995	3.8995	3.8996	3.8997	3.8997	3.8998
12 20	3.8998	3.8999	3.8999	3.9000	3.9000	3.9001	3.9001	3.9002	3.9003	3.9003
12 30	3.9004	3.9004	3.9005	3.9005	3.9006	3.9007	3.9007	3.9007	3.9008	3.9009
12 40	3.9009	3.9010	3.9010	3.9011	3.9011	3.9012	3.9012	3.9013	3.9013	3.9014
12 50	3.9015	3.9015	3.9016	3.9016	3.9017	3.9017	3.9018	3.9018	3.9019	3.9019
2 13 0	3.9020	3.9021	3.9021	3.9022	3.9022	3.9023	3.9023	3.9024	3.9024	3.9025
13 10	3.9025	3.9026	3.9027	3.9027	3.9028	3.9028	3.9029	3.9029	3.9030	3.9030
13 20	3.9031	3.9031	3.9032	3.9033	3.9033	3.9034	3.9034	3.9035	3.9035	3.9036
13 30	3.9036	3.9037	3.9037	3.9038	3.9038	3.9039	3.9040	3.9040	3.9041	3.9041
13 40	3.9042	3.9042	3.9043	3.9043	3.9044	3.9044	3.9045	3.9046	3.9046	3.9047
13 50	3.9047	3.9048	3.9048	3.9049	3.9049	3.9050	3.9050	3.9051	3.9051	3.9052
2 14 0	3.9053	3.9053	3.9054	3.9054	3.9055	3.9055	3.9056	3.9056	3.9057	3.9057
14 10	3.9058	3.9058	3.9059	3.9060	3.9060	3.9061	3.9061	3.9062	3.9062	3.9063
14 20	3.9063	3.9064	3.9064	3.9065	3.9066	3.9066	3.9067	3.9067	3.9068	3.9068
14 30	3.9069	3.9069	3.9070	3.9070	3.9071	3.9071	3.9072	3.9073	3.9073	3.9074
14 40	3.9074	3.9075	3.9075	3.9076	3.9076	3.9077	3.9077	3.9078	3.9078	3.9079
14 50	3.9079	3.9080	3.9081	3.9081	3.9082	3.9082	3.9083	3.9083	3.9084	3.9084
2 15 0	3.9085	3.9085	3.9086	3.9086	3.9087	3.9088	3.9088	3.9089	3.9089	3.9090
15 10	3.9090	3.9091	3.9091	3.9092	3.9092	3.9093	3.9093	3.9094	3.9094	3.9095
15 20	3.9096	3.9096	3.9097	3.9097	3.9098	3.9098	3.9099	3.9099	3.9100	3.9100
15 30	3.9101	3.9101	3.9102	3.9103	3.9103	3.9104	3.9104	3.9105	3.9105	3.9106
15 40	3.9106	3.9107	3.9107	3.9108	3.9108	3.9109	3.9109	3.9110	3.9111	3.9111
15 50	3.9112	3.9112	3.9113	3.9113	3.9114	3.9114	3.9115	3.9115	3.9116	3.9116
2 16 0	3.9117	3.9117	3.9118	3.9118	3.9119	3.9120	3.9120	3.9121	3.9121	3.9122
16 10	3.9122	3.9123	3.9123	3.9124	3.9124	3.9125	3.9125	3.9126	3.9126	3.9127
16 20	3.9128	3.9128	3.9129	3.9129	3.9130	3.9130	3.9131	3.9131	3.9132	3.9132
16 30	3.9133	3.9133	3.9134	3.9134	3.9135	3.9135	3.9136	3.9137	3.9137	3.9138
16 40	3.9138	3.9139	3.9139	3.9140	3.9140	3.9141	3.9141	3.9142	3.9142	3.9143
16 50	3.9143	3.9144	3.9144	3.9145	3.9146	3.9146	3.9147	3.9147	3.9148	3.9148
2 17 0	3.9149	3.9149	3.9150	3.9150	3.9151	3.9151	3.9152	3.9152	3.9153	3.9153
17 10	3.9154	3.9155	3.9155	3.9156	3.9156	3.9157	3.9157	3.9158	3.9158	3.9159
17 20	3.9159	3.9160	3.9160	3.9161	3.9161	3.9162	3.9162	3.9163	3.9163	3.9164
17 30	3.9165	3.9165	3.9166	3.9166	3.9167	3.9167	3.9168	3.9168	3.9169	3.9169
17 40	3.9170	3.9170	3.9171	3.9171	3.9172	3.9172	3.9173	3.9173	3.9174	3.9175
17 50	3.9175	3.9176	3.9176	3.9177	3.9177	3.9178	3.9178	3.9179	3.9179	3.9180
2 18 0	3.9180	3.9181	3.9181	3.9182	3.9182	3.9183	3.9183	3.9184	3.9184	3.9185
18 10	3.9186	3.9186	3.9187	3.9187	3.9188	3.9188	3.9189	3.9189	3.9190	3.9190
18 20	3.9191	3.9191	3.9192	3.9192	3.9193	3.9193	3.9194	3.9194	3.9195	3.9195
18 30	3.9196	3.9197	3.9197	3.9198	3.9198	3.9199	3.9199	3.9200	3.9200	3.9201
18 40	3.9201	3.9202	3.9202	3.9203	3.9203	3.9204	3.9204	3.9205	3.9205	3.9206
18 50	3.9206	3.9207	3.9207	3.9208	3.9209	3.9209	3.9210	3.9210	3.9211	3.9211
2 19 0	3.9212	3.9212	3.9213	3.9213	3.9214	3.9214	3.9215	3.9215	3.9216	3.9216
19 10	3.9217	3.9217	3.9218	3.9218	3.9219	3.9219	3.9220	3.9221	3.9221	3.9222
19 20	3.9222	3.9223	3.9223	3.9224	3.9224	3.9225	3.9225	3.9226	3.9226	3.9227
19 30	3.9227	3.9228	3.9228	3.9229	3.9229	3.9230	3.9230	3.9231	3.9231	3.9232
19 40	3.9232	3.9233	3.9233	3.9234	3.9235	3.9235	3.9236	3.9236	3.9237	3.9237
19 50	3.9238	3.9238	3.9239	3.9239	3.9240	3.9240	3.9241	3.9241	3.9242	3.9242



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
20 0	3.9243	3.9243	3.9244	3.9244	3.9245	3.9245	3.9246	3.9246	3.9247	3.9247
20 10	3.9248	3.9248	3.9249	3.9250	3.9250	3.9251	3.9251	3.9252	3.9252	3.9253
20 20	3.9253	3.9254	3.9254	3.9255	3.9255	3.9256	3.9256	3.9257	3.9257	3.9258
20 30	3.9258	3.9259	3.9259	3.9260	3.9260	3.9261	3.9261	3.9262	3.9262	3.9263
20 40	3.9263	3.9264	3.9264	3.9265	3.9265	3.9266	3.9267	3.9267	3.9268	3.9268
20 50	3.9269	3.9269	3.9270	3.9270	3.9271	3.9271	3.9272	3.9272	3.9273	3.9273
2 21 0	3.9274	3.9274	3.9275	3.9275	3.9276	3.9276	3.9277	3.9277	3.9278	3.9278
21 10	3.9279	3.9279	3.9280	3.9280	3.9281	3.9281	3.9282	3.9282	3.9283	3.9283
21 20	3.9284	3.9284	3.9285	3.9285	3.9286	3.9287	3.9287	3.9288	3.9288	3.9289
21 30	3.9289	3.9290	3.9290	3.9291	3.9291	3.9292	3.9292	3.9293	3.9293	3.9294
21 40	3.9294	3.9295	3.9295	3.9296	3.9296	3.9297	3.9297	3.9298	3.9298	3.9299
21 50	3.9299	3.9300	3.9300	3.9301	3.9301	3.9302	3.9302	3.9303	3.9303	3.9304
2 22 0	3.9304	3.9305	3.9305	3.9306	3.9306	3.9307	3.9307	3.9308	3.9308	3.9309
22 10	3.9309	3.9310	3.9311	3.9311	3.9312	3.9312	3.9313	3.9313	3.9314	3.9314
22 20	3.9315	3.9315	3.9316	3.9316	3.9317	3.9317	3.9318	3.9318	3.9319	3.9319
22 30	3.9320	3.9320	3.9321	3.9321	3.9322	3.9322	3.9323	3.9323	3.9324	3.9324
22 40	3.9325	3.9325	3.9326	3.9326	3.9327	3.9327	3.9328	3.9328	3.9329	3.9329
22 50	3.9330	3.9330	3.9331	3.9331	3.9332	3.9332	3.9333	3.9333	3.9334	3.9334
2 23 0	3.9335	3.9335	3.9336	3.9336	3.9337	3.9337	3.9338	3.9338	3.9339	3.9339
23 10	3.9340	3.9340	3.9341	3.9341	3.9342	3.9342	3.9343	3.9343	3.9344	3.9344
23 20	3.9345	3.9345	3.9346	3.9346	3.9347	3.9348	3.9348	3.9349	3.9349	3.9350
23 30	3.9350	3.9351	3.9351	3.9352	3.9352	3.9353	3.9353	3.9354	3.9354	3.9355
23 40	3.9355	3.9356	3.9356	3.9357	3.9357	3.9358	3.9358	3.9359	3.9359	3.9360
23 50	3.9360	3.9361	3.9361	3.9362	3.9362	3.9363	3.9363	3.9364	3.9364	3.9365
2 24 0	3.9365	3.9366	3.9366	3.9367	3.9367	3.9368	3.9368	3.9369	3.9369	3.9370
24 10	3.9370	3.9371	3.9371	3.9372	3.9372	3.9373	3.9373	3.9374	3.9374	3.9375
24 20	3.9375	3.9376	3.9376	3.9377	3.9377	3.9378	3.9378	3.9379	3.9379	3.9380
24 30	3.9380	3.9381	3.9381	3.9382	3.9382	3.9383	3.9383	3.9384	3.9384	3.9385
24 40	3.9385	3.9386	3.9386	3.9387	3.9387	3.9388	3.9388	3.9389	3.9389	3.9390
24 50	3.9390	3.9391	3.9391	3.9392	3.9392	3.9393	3.9393	3.9394	3.9394	3.9395
2 25 0	3.9395	3.9396	3.9396	3.9397	3.9397	3.9398	3.9398	3.9399	3.9399	3.9400
25 10	3.9400	3.9401	3.9401	3.9402	3.9402	3.9403	3.9403	3.9404	3.9404	3.9405
25 20	3.9405	3.9406	3.9406	3.9407	3.9407	3.9408	3.9408	3.9409	3.9409	3.9410
25 30	3.9410	3.9411	3.9411	3.9412	3.9412	3.9413	3.9413	3.9414	3.9414	3.9415
25 40	3.9415	3.9416	3.9416	3.9417	3.9417	3.9418	3.9418	3.9419	3.9419	3.9420
25 50	3.9420	3.9421	3.9421	3.9422	3.9422	3.9423	3.9423	3.9424	3.9424	3.9425
2 26 0	3.9425	3.9426	3.9426	3.9427	3.9427	3.9428	3.9428	3.9429	3.9429	3.9430
26 10	3.9430	3.9430	3.9431	3.9431	3.9432	3.9432	3.9433	3.9433	3.9434	3.9434
26 20	3.9435	3.9435	3.9436	3.9436	3.9437	3.9437	3.9438	3.9438	3.9439	3.9439
26 30	3.9440	3.9440	3.9441	3.9441	3.9442	3.9442	3.9443	3.9443	3.9444	3.9444
26 40	3.9445	3.9445	3.9446	3.9446	3.9447	3.9447	3.9448	3.9448	3.9449	3.9449
26 50	3.9450	3.9450	3.9451	3.9451	3.9452	3.9452	3.9453	3.9453	3.9454	3.9454
2 27 0	3.9455	3.9455	3.9456	3.9456	3.9457	3.9457	3.9458	3.9458	3.9459	3.9459
27 10	3.9460	3.9460	3.9461	3.9461	3.9462	3.9462	3.9463	3.9463	3.9464	3.9464
27 20	3.9465	3.9465	3.9466	3.9466	3.9467	3.9467	3.9468	3.9468	3.9469	3.9469
27 30	3.9469	3.9470	3.9470	3.9471	3.9471	3.9472	3.9472	3.9473	3.9473	3.9474
27 40	3.9474	3.9475	3.9475	3.9476	3.9476	3.9477	3.9477	3.9478	3.9478	3.9479
27 50	3.9479	3.9480	3.9480	3.9481	3.9481	3.9482	3.9482	3.9483	3.9483	3.9484
2 28 0	3.9484	3.9485	3.9485	3.9486	3.9486	3.9487	3.9487	3.9488	3.9488	3.9489
28 10	3.9489	3.9490	3.9490	3.9490	3.9491	3.9491	3.9492	3.9492	3.9493	3.9493
28 20	3.9494	3.9494	3.9495	3.9495	3.9496	3.9496	3.9497	3.9497	3.9498	3.9498
28 30	3.9499	3.9499	3.9500	3.9500	3.9501	3.9501	3.9502	3.9502	3.9503	3.9503
28 40	3.9504	3.9504	3.9505	3.9505	3.9506	3.9506	3.9507	3.9507	3.9508	3.9508
28 50	3.9509	3.9509	3.9509	3.9510	3.9510	3.9511	3.9511	3.9512	3.9512	3.9513
2 29 0	3.9513	3.9514	3.9514	3.9515	3.9515	3.9516	3.9516	3.9517	3.9517	3.9518
29 10	3.9518	3.9519	3.9519	3.9520	3.9520	3.9521	3.9521	3.9522	3.9522	3.9523
29 20	3.9523	3.9524	3.9524	3.9525	3.9525	3.9526	3.9526	3.9527	3.9527	3.9528
29 30	3.9528	3.9528	3.9529	3.9529	3.9530	3.9530	3.9531	3.9531	3.9532	3.9532
29 40	3.9533	3.9533	3.9534	3.9534	3.9535	3.9535	3.9536	3.9536	3.9537	3.9537
29 50	3.9538	3.9538	3.9539	3.9539	3.9540	3.9540	3.9541	3.9541	3.9542	3.9542



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
2 30 0	3.9542	3.9543	3.9543	3.9544	3.9544	3.9545	3.9545	3.9546	3.9546	3.9547
30 10	3.9547	3.9548	3.9548	3.9549	3.9549	3.9550	3.9550	3.9551	3.9551	3.9552
30 20	3.9552	3.9553	3.9553	3.9554	3.9554	3.9554	3.9555	3.9555	3.9556	3.9556
30 30	3.9557	3.9557	3.9558	3.9558	3.9559	3.9559	3.9560	3.9560	3.9561	3.9561
30 40	3.9562	3.9562	3.9563	3.9563	3.9564	3.9564	3.9565	3.9565	3.9566	3.9566
30 50	3.9566	3.9567	3.9567	3.9568	3.9568	3.9569	3.9569	3.9570	3.9570	3.9571
2 31 0	3.9571	3.9572	3.9572	3.9573	3.9573	3.9574	3.9574	3.9575	3.9575	3.9576
31 10	3.9576	3.9577	3.9577	3.9578	3.9578	3.9579	3.9579	3.9580	3.9580	3.9581
31 20	3.9581	3.9581	3.9582	3.9582	3.9583	3.9583	3.9584	3.9584	3.9585	3.9585
31 30	3.9586	3.9586	3.9587	3.9587	3.9588	3.9588	3.9589	3.9589	3.9590	3.9590
31 40	3.9590	3.9591	3.9591	3.9592	3.9592	3.9593	3.9593	3.9594	3.9594	3.9595
31 50	3.9595	3.9596	3.9596	3.9597	3.9597	3.9598	3.9598	3.9599	3.9599	3.9600
2 32 0	3.9600	3.9600	3.9601	3.9601	3.9602	3.9602	3.9603	3.9603	3.9604	3.9604
32 10	3.9605	3.9605	3.9606	3.9606	3.9607	3.9607	3.9608	3.9608	3.9609	3.9609
32 20	3.9609	3.9610	3.9610	3.9611	3.9611	3.9612	3.9612	3.9613	3.9613	3.9614
32 30	3.9614	3.9615	3.9615	3.9616	3.9616	3.9617	3.9617	3.9618	3.9618	3.9618
32 40	3.9619	3.9619	3.9620	3.9620	3.9621	3.9621	3.9622	3.9622	3.9623	3.9623
32 50	3.9624	3.9624	3.9625	3.9625	3.9626	3.9626	3.9627	3.9627	3.9627	3.9628
2 33 0	3.9628	3.9629	3.9629	3.9630	3.9630	3.9631	3.9631	3.9632	3.9632	3.9633
33 10	3.9633	3.9634	3.9634	3.9634	3.9635	3.9635	3.9636	3.9636	3.9637	3.9637
33 20	3.9638	3.9638	3.9639	3.9639	3.9640	3.9640	3.9641	3.9641	3.9642	3.9642
33 30	3.9642	3.9643	3.9643	3.9644	3.9644	3.9645	3.9645	3.9646	3.9646	3.9647
33 40	3.9647	3.9648	3.9648	3.9649	3.9649	3.9650	3.9650	3.9651	3.9651	3.9652
33 50	3.9652	3.9653	3.9653	3.9653	3.9654	3.9654	3.9655	3.9655	3.9656	3.9656
2 34 0	3.9657	3.9657	3.9658	3.9658	3.9658	3.9659	3.9659	3.9660	3.9660	3.9661
34 10	3.9661	3.9662	3.9662	3.9663	3.9663	3.9664	3.9664	3.9665	3.9665	3.9665
34 20	3.9666	3.9666	3.9667	3.9667	3.9668	3.9668	3.9669	3.9669	3.9670	3.9670
34 30	3.9671	3.9671	3.9672	3.9672	3.9673	3.9673	3.9674	3.9674	3.9675	3.9675
34 40	3.9675	3.9676	3.9676	3.9677	3.9677	3.9678	3.9678	3.9679	3.9679	3.9680
34 50	3.9680	3.9681	3.9681	3.9682	3.9682	3.9682	3.9683	3.9683	3.9684	3.9684
2 35 0	3.9685	3.9685	3.9686	3.9686	3.9687	3.9687	3.9688	3.9688	3.9689	3.9689
35 10	3.9689	3.9690	3.9690	3.9691	3.9691	3.9692	3.9692	3.9693	3.9693	3.9694
35 20	3.9694	3.9695	3.9695	3.9696	3.9696	3.9696	3.9697	3.9697	3.9698	3.9698
35 30	3.9699	3.9699	3.9700	3.9700	3.9701	3.9701	3.9702	3.9702	3.9703	3.9703
35 40	3.9703	3.9704	3.9704	3.9705	3.9705	3.9706	3.9706	3.9707	3.9707	3.9708
35 50	3.9708	3.9709	3.9709	3.9710	3.9710	3.9710	3.9711	3.9711	3.9712	3.9712
2 36 0	3.9713	3.9713	3.9714	3.9714	3.9715	3.9715	3.9716	3.9716	3.9717	3.9717
36 10	3.9717	3.9718	3.9718	3.9719	3.9719	3.9720	3.9720	3.9721	3.9721	3.9722
36 20	3.9722	3.9722	3.9723	3.9723	3.9724	3.9724	3.9725	3.9725	3.9726	3.9726
36 30	3.9727	3.9727	3.9728	3.9728	3.9729	3.9729	3.9729	3.9730	3.9730	3.9731
36 40	3.9731	3.9732	3.9732	3.9733	3.9733	3.9734	3.9734	3.9735	3.9735	3.9735
36 50	3.9736	3.9736	3.9737	3.9737	3.9738	3.9738	3.9739	3.9739	3.9740	3.9740
2 37 0	3.9741	3.9741	3.9742	3.9742	3.9743	3.9743	3.9744	3.9744	3.9745	3.9745
37 10	3.9745	3.9746	3.9746	3.9746	3.9747	3.9747	3.9748	3.9748	3.9749	3.9749
37 20	3.9750	3.9750	3.9751	3.9751	3.9752	3.9752	3.9753	3.9753	3.9754	3.9754
37 30	3.9754	3.9755	3.9755	3.9756	3.9756	3.9757	3.9757	3.9758	3.9758	3.9758
37 40	3.9759	3.9759	3.9760	3.9760	3.9761	3.9761	3.9762	3.9762	3.9763	3.9763
37 50	3.9763	3.9764	3.9764	3.9765	3.9765	3.9766	3.9766	3.9767	3.9767	3.9768
2 38 0	3.9768	3.9769	3.9769	3.9769	3.9770	3.9770	3.9771	3.9771	3.9772	3.9772
38 10	3.9773	3.9773	3.9774	3.9774	3.9775	3.9775	3.9776	3.9776	3.9777	3.9777
38 20	3.9777	3.9778	3.9778	3.9779	3.9779	3.9779	3.9780	3.9780	3.9781	3.9781
38 30	3.9782	3.9782	3.9783	3.9783	3.9784	3.9784	3.9785	3.9785	3.9786	3.9786
38 40	3.9786	3.9787	3.9787	3.9788	3.9788	3.9789	3.9789	3.9790	3.9790	3.9790
38 50	3.9791	3.9791	3.9792	3.9792	3.9793	3.9793	3.9794	3.9794	3.9795	3.9795
2 39 0	3.9796	3.9796	3.9797	3.9797	3.9797	3.9798	3.9798	3.9799	3.9799	3.9800
39 10	3.9800	3.9800	3.9801	3.9801	3.9802	3.9802	3.9803	3.9803	3.9804	3.9804
39 20	3.9805	3.9805	3.9805	3.9806	3.9806	3.9807	3.9807	3.9808	3.9808	3.9809
39 30	3.9809	3.9810	3.9810	3.9810	3.9811	3.9811	3.9812	3.9812	3.9813	3.9813
39 40	3.9814	3.9814	3.9815	3.9815	3.9815	3.9816	3.9816	3.9817	3.9817	3.9818
39 50	3.9818	3.9819	3.9819	3.9819	3.9820	3.9820	3.9821	3.9821	3.9822	3.9822



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
$0^{\circ} 40' 0''$	3.9823	3.9823	3.9824	3.9824	3.9825	3.9825	3.9825	3.9826	3.9826	3.9827
40 10	3.9827	3.9828	3.9828	3.9829	3.9829	3.9829	3.9830	3.9830	3.9831	3.9831
40 20	3.9832	3.9832	3.9833	3.9833	3.9834	3.9834	3.9834	3.9835	3.9835	3.9836
40 30	3.9836	3.9837	3.9837	3.9838	3.9838	3.9839	3.9839	3.9839	3.9840	3.9840
40 40	3.9841	3.9841	3.9842	3.9842	3.9843	3.9843	3.9843	3.9844	3.9844	3.9845
40 50	3.9845	3.9846	3.9846	3.9847	3.9847	3.9848	3.9848	3.9848	3.9849	3.9849
2 41 0	3.9850	3.9850	3.9851	3.9851	3.9852	3.9852	3.9852	3.9853	3.9853	3.9854
41 10	3.9854	3.9855	3.9855	3.9856	3.9856	3.9857	3.9857	3.9857	3.9858	3.9858
41 20	3.9859	3.9859	3.9860	3.9860	3.9861	3.9861	3.9861	3.9862	3.9862	3.9863
41 30	3.9863	3.9864	3.9864	3.9865	3.9865	3.9866	3.9866	3.9866	3.9867	3.9867
41 40	3.9868	3.9868	3.9869	3.9869	3.9870	3.9870	3.9870	3.9871	3.9871	3.9872
41 50	3.9872	3.9873	3.9873	3.9874	3.9874	3.9874	3.9875	3.9875	3.9876	3.9876
2 42 0	3.9877	3.9877	3.9878	3.9878	3.9878	3.9879	3.9879	3.9880	3.9880	3.9881
42 10	3.9881	3.9882	3.9882	3.9882	3.9883	3.9883	3.9884	3.9884	3.9885	3.9885
42 20	3.9886	3.9886	3.9886	3.9887	3.9887	3.9888	3.9888	3.9889	3.9889	3.9890
42 30	3.9890	3.9890	3.9891	3.9891	3.9892	3.9892	3.9893	3.9893	3.9894	3.9894
42 40	3.9894	3.9895	3.9895	3.9896	3.9896	3.9897	3.9897	3.9898	3.9898	3.9898
42 50	3.9899	3.9899	3.9900	3.9900	3.9901	3.9901	3.9902	3.9902	3.9903	3.9903
2 43 0	3.9903	3.9904	3.9904	3.9905	3.9905	3.9906	3.9906	3.9906	3.9907	3.9907
43 10	3.9908	3.9908	3.9909	3.9909	3.9910	3.9910	3.9910	3.9911	3.9911	3.9912
43 20	3.9912	3.9913	3.9913	3.9914	3.9914	3.9914	3.9915	3.9915	3.9916	3.9916
43 30	3.9917	3.9917	3.9918	3.9918	3.9918	3.9919	3.9919	3.9920	3.9920	3.9921
43 40	3.9921	3.9922	3.9922	3.9922	3.9923	3.9923	3.9924	3.9924	3.9925	3.9925
43 50	3.9926	3.9926	3.9926	3.9927	3.9927	3.9928	3.9928	3.9929	3.9929	3.9930
2 44 0	3.9930	3.9930	3.9931	3.9931	3.9932	3.9932	3.9933	3.9933	3.9933	3.9934
44 10	3.9934	3.9935	3.9935	3.9936	3.9936	3.9937	3.9937	3.9937	3.9938	3.9938
44 20	3.9939	3.9939	3.9940	3.9940	3.9941	3.9941	3.9941	3.9942	3.9942	3.9943
44 30	3.9943	3.9944	3.9944	3.9944	3.9945	3.9945	3.9946	3.9946	3.9947	3.9947
44 40	3.9948	3.9948	3.9948	3.9949	3.9949	3.9950	3.9950	3.9951	3.9951	3.9952
44 50	3.9952	3.9952	3.9953	3.9953	3.9954	3.9954	3.9955	3.9955	3.9955	3.9956
2 45 0	3.9956	3.9957	3.9957	3.9958	3.9958	3.9959	3.9959	3.9959	3.9960	3.9960
45 10	3.9961	3.9961	3.9962	3.9962	3.9962	3.9963	3.9963	3.9964	3.9964	3.9965
45 20	3.9965	3.9966	3.9966	3.9966	3.9967	3.9967	3.9968	3.9968	3.9969	3.9969
45 30	3.9969	3.9970	3.9970	3.9971	3.9971	3.9972	3.9972	3.9973	3.9973	3.9973
45 40	3.9974	3.9974	3.9975	3.9975	3.9976	3.9976	3.9976	3.9977	3.9977	3.9978
45 50	3.9978	3.9979	3.9979	3.9980	3.9980	3.9980	3.9981	3.9981	3.9982	3.9982
2 46 0	3.9983	3.9983	3.9983	3.9984	3.9984	3.9985	3.9985	3.9986	3.9986	3.9987
46 10	3.9987	3.9987	3.9988	3.9988	3.9989	3.9989	3.9990	3.9990	3.9990	3.9991
46 20	3.9991	3.9992	3.9992	3.9993	3.9993	3.9993	3.9994	3.9994	3.9995	3.9995
46 30	3.9996	3.9996	3.9997	3.9997	3.9997	3.9998	3.9998	3.9999	3.9999	4.0000
46 40	4.0000	4.0000	4.0001	4.0001	4.0002	4.0002	4.0003	4.0003	4.0003	4.0004
46 50	4.0004	4.0005	4.0005	4.0006	4.0006	4.0007	4.0007	4.0007	4.0008	4.0008
2 47 0	4.0009	4.0009	4.0010	4.0010	4.0010	4.0011	4.0011	4.0012	4.0012	4.0013
47 10	4.0013	4.0013	4.0014	4.0014	4.0015	4.0015	4.0016	4.0016	4.0016	4.0017
47 20	4.0017	4.0018	4.0018	4.0019	4.0019	4.0019	4.0020	4.0020	4.0021	4.0021
47 30	4.0022	4.0022	4.0023	4.0023	4.0023	4.0024	4.0024	4.0025	4.0025	4.0026
47 40	4.0026	4.0026	4.0027	4.0027	4.0028	4.0028	4.0029	4.0029	4.0029	4.0030
47 50	4.0030	4.0031	4.0031	4.0032	4.0032	4.0032	4.0033	4.0033	4.0034	4.0034
2 48 0	4.0035	4.0035	4.0035	4.0036	4.0036	4.0037	4.0037	4.0038	4.0038	4.0038
48 10	4.0039	4.0039	4.0040	4.0040	4.0041	4.0041	4.0041	4.0042	4.0042	4.0043
48 20	4.0043	4.0044	4.0044	4.0045	4.0045	4.0045	4.0046	4.0046	4.0047	4.0047
48 30	4.0048	4.0048	4.0048	4.0049	4.0049	4.0050	4.0050	4.0051	4.0051	4.0051
48 40	4.0052	4.0052	4.0053	4.0053	4.0054	4.0054	4.0054	4.0055	4.0055	4.0056
48 50	4.0056	4.0057	4.0057	4.0057	4.0058	4.0058	4.0059	4.0059	4.0060	4.0060
2 49 0	4.0060	4.0061	4.0061	4.0062	4.0062	4.0063	4.0063	4.0063	4.0064	4.0064
49 10	4.0065	4.0065	4.0066	4.0066	4.0066	4.0067	4.0067	4.0068	4.0068	4.0069
49 20	4.0069	4.0069	4.0070	4.0070	4.0071	4.0071	4.0072	4.0072	4.0072	4.0073
49 30	4.0073	4.0074	4.0074	4.0074	4.0075	4.0075	4.0076	4.0076	4.0077	4.0077
49 40	4.0077	4.0078	4.0078	4.0079	4.0079	4.0080	4.0080	4.0080	4.0081	4.0081
49 50	4.0082	4.0082	4.0083	4.0083	4.0083	4.0084	4.0084	4.0085	4.0085	4.0086



# TABLE I.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
$2^h 50^m 0^s$	4.0086	4.0086	4.0087	4.0087	4.0088	4.0088	4.0089	4.0089	4.0089	4.0090
50 10	4.0090	4.0091	4.0091	4.0092	4.0092	4.0092	4.0093	4.0093	4.0094	4.0094
50 20	4.0095	4.0095	4.0095	4.0096	4.0096	4.0097	4.0097	4.0097	4.0098	4.0098
50 30	4.0099	4.0099	4.0100	4.0100	4.0100	4.0101	4.0101	4.0102	4.0102	4.0103
50 40	4.0103	4.0103	4.0104	4.0104	4.0105	4.0105	4.0106	4.0106	4.0106	4.0107
50 50	4.0107	4.0108	4.0108	4.0109	4.0109	4.0109	4.0110	4.0110	4.0111	4.0111
2 51 0	4.0111	4.0112	4.0112	4.0113	4.0113	4.0114	4.0114	4.0114	4.0115	4.0115
51 10	4.0116	4.0116	4.0117	4.0117	4.0117	4.0118	4.0118	4.0119	4.0119	4.0120
51 20	4.0120	4.0120	4.0121	4.0121	4.0122	4.0122	4.0122	4.0123	4.0123	4.0124
51 30	4.0124	4.0125	4.0125	4.0125	4.0126	4.0126	4.0127	4.0127	4.0128	4.0128
51 40	4.0128	4.0129	4.0129	4.0130	4.0130	4.0130	4.0131	4.0131	4.0132	4.0132
51 50	4.0133	4.0133	4.0133	4.0134	4.0134	4.0135	4.0135	4.0136	4.0136	4.0136
2 52 0	4.0137	4.0137	4.0138	4.0138	4.0138	4.0139	4.0139	4.0140	4.0140	4.0141
52 10	4.0141	4.0141	4.0142	4.0142	4.0143	4.0143	4.0144	4.0144	4.0144	4.0145
52 20	4.0145	4.0146	4.0146	4.0146	4.0147	4.0147	4.0148	4.0148	4.0149	4.0149
52 30	4.0149	4.0150	4.0150	4.0151	4.0151	4.0152	4.0152	4.0153	4.0153	4.0153
52 40	4.0154	4.0154	4.0154	4.0155	4.0155	4.0156	4.0156	4.0157	4.0157	4.0157
52 50	4.0158	4.0158	4.0159	4.0159	4.0159	4.0160	4.0160	4.0161	4.0161	4.0162
2 53 0	4.0162	4.0162	4.0163	4.0163	4.0164	4.0164	4.0164	4.0165	4.0165	4.0166
53 10	4.0166	4.0167	4.0167	4.0167	4.0168	4.0168	4.0169	4.0169	4.0169	4.0170
53 20	4.0170	4.0171	4.0171	4.0172	4.0172	4.0172	4.0173	4.0173	4.0174	4.0174
53 30	4.0175	4.0175	4.0175	4.0176	4.0176	4.0177	4.0177	4.0177	4.0178	4.0178
53 40	4.0179	4.0179	4.0180	4.0180	4.0180	4.0181	4.0181	4.0182	4.0182	4.0182
53 50	4.0183	4.0183	4.0184	4.0184	4.0185	4.0185	4.0185	4.0186	4.0186	4.0187
2 54 0	4.0187	4.0187	4.0188	4.0188	4.0189	4.0189	4.0190	4.0190	4.0190	4.0191
54 10	4.0191	4.0192	4.0192	4.0192	4.0193	4.0193	4.0194	4.0194	4.0194	4.0195
54 20	4.0195	4.0196	4.0196	4.0197	4.0197	4.0197	4.0198	4.0198	4.0199	4.0199
54 30	4.0199	4.0200	4.0200	4.0201	4.0201	4.0202	4.0202	4.0202	4.0203	4.0203
54 40	4.0204	4.0204	4.0204	4.0205	4.0205	4.0206	4.0206	4.0207	4.0207	4.0207
54 50	4.0208	4.0208	4.0209	4.0209	4.0209	4.0210	4.0210	4.0211	4.0211	4.0211
2 55 0	4.0212	4.0212	4.0213	4.0213	4.0214	4.0214	4.0214	4.0215	4.0215	4.0216
55 10	4.0216	4.0216	4.0217	4.0217	4.0218	4.0218	4.0219	4.0219	4.0219	4.0220
55 20	4.0220	4.0221	4.0221	4.0221	4.0222	4.0222	4.0223	4.0223	4.0223	4.0224
55 30	4.0224	4.0225	4.0225	4.0225	4.0226	4.0226	4.0227	4.0227	4.0228	4.0228
55 40	4.0228	4.0229	4.0229	4.0230	4.0230	4.0230	4.0231	4.0231	4.0232	4.0232
55 50	4.0233	4.0233	4.0233	4.0234	4.0234	4.0235	4.0235	4.0235	4.0236	4.0236
2 56 0	4.0237	4.0237	4.0237	4.0238	4.0238	4.0239	4.0239	4.0240	4.0240	4.0240
56 10	4.0241	4.0241	4.0242	4.0242	4.0242	4.0243	4.0243	4.0244	4.0244	4.0244
56 20	4.0245	4.0245	4.0246	4.0246	4.0246	4.0247	4.0247	4.0248	4.0248	4.0249
56 30	4.0249	4.0249	4.0250	4.0250	4.0251	4.0251	4.0251	4.0252	4.0252	4.0253
56 40	4.0253	4.0253	4.0254	4.0254	4.0255	4.0255	4.0256	4.0256	4.0256	4.0257
56 50	4.0257	4.0258	4.0258	4.0258	4.0259	4.0259	4.0260	4.0260	4.0260	4.0261
2 57 0	4.0261	4.0262	4.0262	4.0262	4.0263	4.0263	4.0264	4.0264	4.0265	4.0265
57 10	4.0265	4.0266	4.0266	4.0267	4.0267	4.0267	4.0268	4.0268	4.0269	4.0269
57 20	4.0269	4.0270	4.0270	4.0271	4.0271	4.0271	4.0272	4.0272	4.0273	4.0273
57 30	4.0273	4.0274	4.0274	4.0275	4.0275	4.0276	4.0276	4.0276	4.0277	4.0277
57 40	4.0278	4.0278	4.0278	4.0279	4.0279	4.0280	4.0280	4.0280	4.0281	4.0281
57 50	4.0282	4.0282	4.0282	4.0283	4.0283	4.0284	4.0284	4.0284	4.0285	4.0285
2 58 0	4.0286	4.0286	4.0287	4.0287	4.0287	4.0288	4.0288	4.0289	4.0289	4.0289
58 10	4.0290	4.0290	4.0291	4.0291	4.0291	4.0292	4.0292	4.0293	4.0293	4.0293
58 20	4.0294	4.0294	4.0295	4.0295	4.0295	4.0296	4.0296	4.0297	4.0297	4.0297
58 30	4.0298	4.0298	4.0299	4.0299	4.0300	4.0300	4.0300	4.0301	4.0301	4.0302
58 40	4.0302	4.0302	4.0303	4.0303	4.0304	4.0304	4.0304	4.0305	4.0305	4.0306
58 50	4.0306	4.0306	4.0307	4.0307	4.0308	4.0308	4.0308	4.0309	4.0309	4.0310
2 59 0	4.0310	4.0310	4.0311	4.0311	4.0312	4.0312	4.0312	4.0313	4.0313	4.0314
59 10	4.0314	4.0314	4.0315	4.0315	4.0316	4.0316	4.0317	4.0317	4.0317	4.0318
59 20	4.0318	4.0319	4.0319	4.0319	4.0320	4.0320	4.0321	4.0321	4.0321	4.0322
59 30	4.0322	4.0323	4.0323	4.0323	4.0324	4.0324	4.0325	4.0325	4.0325	4.0326
59 40	4.0326	4.0327	4.0327	4.0327	4.0328	4.0328	4.0329	4.0329	4.0329	4.0330
59 50	4.0330	4.0331	4.0331	4.0331	4.0332	4.0332	4.0333	4.0333	4.0333	4.0334



# TABLE II.

TABLE, SHOWING THE CORRECTION REQUIRED, ON ACCOUNT OF  
SECOND DIFFERENCES OF THE MOON'S MOTION, IN FINDING  
THE GREENWICH TIME CORRESPONDING TO A  
CORRECTED LUNAR DISTANCE.

Approximate Interval.		Difference of the Proportional Logarithms in the Ephemeris.																											
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52		
h. m.	h. m.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.		
0 0	3 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0 10	2 50	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3		
0 20	2 40	0	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	4	5	5	5	5	6	6	6		
0 30	2 30	0	1	1	2	2	2	2	3	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9		
0 40	2 20	0	1	1	2	2	3	3	3	4	4	5	5	6	6	6	7	7	8	8	9	9	10	10	11	11	11		
0 50	2 10	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13		
1 0	2 0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13	14	14		
1 10	1 50	1	1	2	2	3	4	4	5	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	15		
1 20	1 40	1	1	2	3	3	4	4	5	6	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	16	16		
1 30	1 30	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16		

		Difference of the Proportional Logarithms in the Ephemeris.																										
		54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102		
h. m.	h. m.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.		
0 0	3 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0 10	2 50	4	4	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	6	6	7	7	7		
0 20	2 40	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	13	13		
0 30	2 30	9	10	10	10	11	11	12	12	13	13	13	14	14	14	14	15	15	16	16	16	17	17	17	18	18		
0 40	2 20	12	12	13	13	13	14	14	15	15	16	16	16	17	17	18	18	19	19	19	20	20	21	21	22	22		
0 50	2 10	14	14	15	15	16	16	16	17	17	18	18	19	19	20	20	21	21	22	22	22	23	23	24	24	26		
1 0	2 0	15	16	16	17	17	18	18	19	19	20	21	21	22	22	23	23	24	24	25	25	26	27	27	28	28		
1 10	1 50	16	17	17	18	18	19	19	20	21	21	22	22	23	24	24	25	25	26	27	27	28	28	29	30	30		
1 20	1 40	17	17	18	19	19	20	20	21	21	22	23	23	24	25	25	26	26	27	28	28	29	29	30	31	31		
1 30	1 30	17	18	18	19	19	20	21	21	22	23	23	24	24	25	25	26	27	27	28	29	29	30	31	31	32		

		Difference of the Proportional Logarithms in the Ephemeris.													
		104	106	108	110	112	114	116	118	120	122	124	126	128	130
h. m.	h. m.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	
0 0	3 0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0 10	2 50	7	7	7	7	7	7	8	8	8	8	8	8	8	
0 20	2 40	13	13	13	14	14	14	14	15	15	15	15	15	16	
0 30	2 30	18	18	19	19	19	20	20	20	21	21	21	22	22	
0 40	2 20	22	23	23	24	24	25	25	26	26	27	27	28	28	
0 50	2 10	26	26	27	27	28	29	29	29	30	30	31	31	32	
1 0	2 0	29	29	30	30	31	31	32	33	33	34	34	35	35	
1 10	1 50	31	31	32	32	33	34	34	35	35	36	37	37	38	
1 20	1 40	32	33	33	34	34	35	35	36	37	38	38	39	39	
1 30	1 30	32	33	34	34	35	35	36	36	37	38	39	39	40	

The Correction is to be added to the approximate Greenwich Time when the Proportional Logarithms in the Ephemeris are decreasing, and subtracted when they are increasing.



# TABLE III. SIDEREAL INTO MEAN SOLAR TIME.

Sidereal.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.
0	0 00.000	0 09.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 08.807	1 0.003
1	0 00.164	0 09.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 08.971	2 .005
2	0 00.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 09.135	3 .008
3	0 00.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 09.298	4 .011
4	0 00.655	0 10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 09.462	5 .014
5	0 00.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 09.626	6 .016
6	0 00.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 09.790	7 .019
7	0 01.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 00.124	1 09.954	8 .022
8	0 01.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 00.288	1 10.118	9 .025
9	0 01.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 00.452	1 10.281	10 .027
10	0 01.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 00.616	1 10.445	11 .030
11	0 01.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 00.779	1 10.609	12 .033
12	0 01.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 00.943	1 10.773	13 .035
13	0 02.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 01.107	1 10.937	14 .038
14	0 02.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 01.271	1 11.100	15 .041
15	0 02.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 01.435	1 11.264	16 .044
16	0 02.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 01.599	1 11.428	17 .046
17	0 02.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 01.762	1 11.592	18 .049
18	0 02.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 01.926	1 11.756	19 .052
19	0 03.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 02.090	1 11.920	20 .055
20	0 03.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 02.254	1 12.083	21 .057
21	0 03.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 02.418	1 12.247	22 .060
22	0 03.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 02.582	1 12.411	23 .063
23	0 03.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 02.745	1 12.575	24 .066
24	0 03.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 02.909	1 12.739	25 .068
25	0 04.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 03.073	1 12.903	26 .071
26	0 04.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 03.237	1 13.066	27 .074
27	0 04.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 03.401	1 13.230	28 .076
28	0 04.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 03.564	1 13.394	29 .079
29	0 04.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 03.728	1 13.558	30 .082
30	0 04.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 03.892	1 13.722	31 .085
31	0 05.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 04.056	1 13.886	32 .087
32	0 05.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 04.220	1 14.049	33 .090
33	0 05.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 04.384	1 14.213	34 .093
34	0 05.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 04.547	1 14.377	35 .096
35	0 05.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 04.711	1 14.541	36 .098
36	0 05.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 04.875	1 14.705	37 .101
37	0 06.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 05.039	1 14.868	38 .104
38	0 06.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 05.203	1 15.032	39 .106
39	0 06.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 05.367	1 15.196	40 .109
40	0 06.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 05.530	1 15.360	41 .112
41	0 06.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 05.694	1 15.524	42 .115
42	0 06.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 05.858	1 15.688	43 .117
43	0 07.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 06.022	1 15.851	44 .120
44	0 07.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 06.186	1 16.015	45 .123
45	0 07.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 06.350	1 16.179	46 .126
46	0 07.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 06.513	1 16.343	47 .128
47	0 07.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 06.677	1 16.507	48 .131
48	0 07.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 06.841	1 16.671	49 .134
49	0 08.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 07.005	1 16.834	50 .137
50	0 08.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 07.169	1 16.998	51 .139
51	0 08.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 07.332	1 17.162	52 .142
52	0 08.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 07.496	1 17.326	53 .145
53	0 08.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 07.660	1 17.490	54 .147
54	0 08.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 07.824	1 17.654	55 .150
55	0 09.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 07.988	1 17.817	56 .153
56	0 09.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 08.152	1 17.981	57 .156
57	0 09.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 08.315	1 18.145	58 .158
58	0 09.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 08.479	1 18.309	59 .161
59	0 09.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 08.643	1 18.473	



# TABLE III. SIDEREAL INTO MEAN SOLAR TIME.

Sidereal.	8 h.	9 h.	10 h.	11 h.	12 h.	13 h.	14 h.	15 h.	For Seconds.
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s. s.
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 07.784	2 17.614	2 27.443	1 0.003
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 07.948	2 17.778	2 27.607	2 .005
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 08.112	2 17.941	2 27.771	3 .008
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 08.276	2 18.105	2 27.935	4 .011
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 08.440	2 18.269	2 28.099	5 .014
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 08.603	2 18.433	2 28.263	6 .016
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 08.767	2 18.597	2 28.426	7 .019
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 08.931	2 18.761	2 28.590	8 .022
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 09.095	2 18.924	2 28.754	9 .025
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 09.259	2 19.088	2 28.918	10 .027
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 09.423	2 19.252	2 29.082	11 .030
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 09.586	2 19.416	2 29.245	12 .033
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 09.750	2 19.580	2 29.409	13 .035
13	1 20.766	1 30.596	1 40.425	1 50.255	2 00.084	2 09.914	2 19.744	2 29.573	14 .038
14	1 20.930	1 30.760	1 40.589	1 50.419	2 00.248	2 10.078	2 19.907	2 29.737	15 .041
15	1 21.094	1 30.923	1 40.753	1 50.583	2 00.412	2 10.242	2 20.071	2 29.901	16 .044
16	1 21.258	1 31.087	1 40.917	1 50.746	2 00.576	2 10.405	2 20.235	2 30.065	17 .046
17	1 21.422	1 31.251	1 41.081	1 50.910	2 00.740	2 10.569	2 20.399	2 30.228	18 .049
18	1 21.585	1 31.415	1 41.244	1 51.074	2 00.904	2 10.733	2 20.563	2 30.392	19 .052
19	1 21.749	1 31.579	1 41.408	1 51.238	2 01.067	2 10.897	2 20.727	2 30.556	20 .055
20	1 21.913	1 31.743	1 41.572	1 51.402	2 01.231	2 11.061	2 20.890	2 30.720	21 .057
21	1 22.077	1 31.906	1 41.736	1 51.565	2 01.395	2 11.225	2 21.054	2 30.884	22 .060
22	1 22.241	1 32.070	1 41.900	1 51.729	2 01.559	2 11.388	2 21.218	2 31.048	23 .063
23	1 22.404	1 32.234	1 42.064	1 51.893	2 01.723	2 11.552	2 21.382	2 31.212	24 .066
24	1 22.568	1 32.398	1 42.227	1 52.057	2 01.887	2 11.716	2 21.546	2 31.375	25 .068
25	1 22.732	1 32.562	1 42.391	1 52.221	2 02.050	2 11.880	2 21.709	2 31.539	26 .071
26	1 22.896	1 32.726	1 42.555	1 52.385	2 02.214	2 12.044	2 21.873	2 31.703	27 .074
27	1 23.060	1 32.889	1 42.719	1 52.548	2 02.378	2 12.208	2 22.037	2 31.867	28 .076
28	1 23.224	1 33.053	1 42.883	1 52.712	2 02.542	2 12.371	2 22.201	2 32.031	29 .079
29	1 23.387	1 33.217	1 43.047	1 52.876	2 02.706	2 12.535	2 22.365	2 32.194	30 .082
30	1 23.551	1 33.381	1 43.210	1 53.040	2 02.869	2 12.699	2 22.529	2 32.358	31 .085
31	1 23.715	1 33.545	1 43.374	1 53.204	2 03.033	2 12.863	2 22.692	2 32.522	32 .087
32	1 23.879	1 33.708	1 43.538	1 53.368	2 03.197	2 13.027	2 22.856	2 32.686	33 .090
33	1 24.043	1 33.872	1 43.702	1 53.531	2 03.361	2 13.191	2 23.020	2 32.850	34 .093
34	1 24.207	1 34.036	1 43.866	1 53.695	2 03.525	2 13.354	2 23.184	2 33.013	35 .096
35	1 24.370	1 34.200	1 44.029	1 53.859	2 03.689	2 13.518	2 23.348	2 33.177	36 .098
36	1 24.534	1 34.364	1 44.193	1 54.023	2 03.852	2 13.682	2 23.512	2 33.341	37 .101
37	1 24.698	1 34.528	1 44.357	1 54.187	2 04.016	2 13.846	2 23.675	2 33.505	38 .104
38	1 24.862	1 34.691	1 44.521	1 54.351	2 04.180	2 14.010	2 23.839	2 33.669	39 .106
39	1 25.026	1 34.855	1 44.685	1 54.514	2 04.344	2 14.173	2 24.003	2 33.833	40 .109
40	1 25.190	1 35.019	1 44.849	1 54.678	2 04.508	2 14.337	2 24.167	2 33.996	41 .112
41	1 25.353	1 35.183	1 45.012	1 54.842	2 04.672	2 14.501	2 24.331	2 34.160	42 .115
42	1 25.517	1 35.347	1 45.176	1 55.006	2 04.835	2 14.665	2 24.495	2 34.324	43 .117
43	1 25.681	1 35.511	1 45.340	1 55.170	2 04.999	2 14.829	2 24.658	2 34.488	44 .120
44	1 25.845	1 35.674	1 45.504	1 55.333	2 05.163	2 14.993	2 24.822	2 34.652	45 .123
45	1 26.009	1 35.838	1 45.668	1 55.497	2 05.327	2 15.156	2 24.986	2 34.816	46 .126
46	1 26.172	1 36.002	1 45.832	1 55.661	2 05.491	2 15.320	2 25.150	2 34.979	47 .128
47	1 26.336	1 36.166	1 45.995	1 55.825	2 05.655	2 15.484	2 25.314	2 35.143	48 .131
48	1 26.500	1 36.330	1 46.159	1 55.989	2 05.818	2 15.648	2 25.477	2 35.307	49 .134
49	1 26.664	1 36.493	1 46.323	1 56.153	2 05.982	2 15.812	2 25.641	2 35.471	50 .137
50	1 26.828	1 36.657	1 46.487	1 56.316	2 06.146	2 15.976	2 25.805	2 35.635	51 .139
51	1 26.992	1 36.821	1 46.651	1 56.480	2 06.310	2 16.139	2 25.969	2 35.798	52 .142
52	1 27.155	1 36.985	1 46.815	1 56.644	2 06.474	2 16.303	2 26.133	2 35.962	53 .145
53	1 27.319	1 37.149	1 46.978	1 56.808	2 06.637	2 16.467	2 26.297	2 36.126	54 .147
54	1 27.483	1 37.313	1 47.142	1 56.972	2 06.801	2 16.631	2 26.460	2 36.290	55 .150
55	1 27.647	1 37.476	1 47.306	1 57.136	2 06.965	2 16.795	2 26.624	2 36.454	56 .153
56	1 27.811	1 37.640	1 47.470	1 57.299	2 07.129	2 16.959	2 26.788	2 36.618	57 .156
57	1 27.975	1 37.804	1 47.634	1 57.463	2 07.293	2 17.122	2 26.952	2 36.781	58 .158
58	1 28.138	1 37.968	1 47.797	1 57.627	2 07.457	2 17.286	2 27.116	2 36.945	59 .161
59	1 28.302	1 38.132	1 47.961	1 57.791	2 07.620	2 17.450	2 27.280	2 37.109	



# TABLE III. SIDEREAL INTO MEAN SOLAR TIME.

Sidereal.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.
0	2 37.273	2 47.102	2 56.932	3 06.762	3 16.591	3 26.421	3 36.250	3 46.080	1 0.003
1	2 37.437	2 47.266	2 57.096	3 06.925	3 16.755	3 26.585	3 36.414	3 46.244	2 .005
2	2 37.601	2 47.430	2 57.260	3 07.089	3 16.919	3 26.748	3 36.578	3 46.407	3 .008
3	2 37.764	2 47.594	2 57.424	3 07.253	3 17.083	3 26.912	3 36.742	3 46.571	4 .011
4	2 37.928	2 47.758	2 57.587	3 07.417	3 17.246	3 27.076	3 36.906	3 46.735	5 .014
5	2 38.092	2 47.922	2 57.751	3 07.581	3 17.410	3 27.240	3 37.069	3 46.899	6 .016
6	2 38.256	2 48.085	2 57.915	3 07.745	3 17.574	3 27.404	3 37.233	3 47.063	7 .019
7	2 38.420	2 48.249	2 58.079	3 07.908	3 17.738	3 27.568	3 37.397	3 47.227	8 .022
8	2 38.584	2 48.413	2 58.243	3 08.072	3 17.902	3 27.731	3 37.561	3 47.390	9 .025
9	2 38.747	2 48.577	2 58.406	3 08.236	3 18.066	3 27.895	3 37.725	3 47.554	10 .027
10	2 38.911	2 48.741	2 58.570	3 08.400	3 18.229	3 28.059	3 37.889	3 47.718	11 .030
11	2 39.075	2 48.905	2 58.734	3 08.564	3 18.393	3 28.223	3 38.052	3 47.882	12 .033
12	2 39.239	2 49.068	2 58.898	3 08.728	3 18.557	3 28.387	3 38.216	3 48.046	13 .035
13	2 39.403	2 49.232	2 59.062	3 08.891	3 18.721	3 28.550	3 38.380	3 48.210	14 .038
14	2 39.566	2 49.396	2 59.226	3 09.055	3 18.885	3 28.714	3 38.544	3 48.373	15 .041
15	2 39.730	2 49.560	2 59.389	3 09.219	3 19.049	3 28.878	3 38.708	3 48.537	16 .044
16	2 39.894	2 49.724	2 59.553	3 09.383	3 19.212	3 29.042	3 38.871	3 48.701	17 .046
17	2 40.058	2 49.888	2 59.717	3 09.547	3 19.376	3 29.206	3 39.035	3 48.865	18 .049
18	2 40.222	2 50.051	2 59.881	3 09.710	3 19.540	3 29.370	3 39.199	3 49.029	19 .052
19	2 40.386	2 50.215	3 00.045	3 09.874	3 19.704	3 29.533	3 39.363	3 49.193	20 .055
20	2 40.549	2 50.379	3 00.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	21 .057
21	2 40.713	2 50.543	3 00.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	22 .060
22	2 40.877	2 50.707	3 00.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	23 .063
23	2 41.041	2 50.870	3 00.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	24 .066
24	2 41.205	2 51.034	3 00.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	25 .068
25	2 41.369	2 51.198	3 01.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	26 .071
26	2 41.532	2 51.362	3 01.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	27 .074
27	2 41.696	2 51.526	3 01.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	28 .076
28	2 41.860	2 51.690	3 01.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	29 .079
29	2 42.024	2 51.853	3 01.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	30 .082
30	2 42.188	2 52.017	3 01.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	31 .085
31	2 42.352	2 52.181	3 02.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	32 .087
32	2 42.515	2 52.345	3 02.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	33 .090
33	2 42.679	2 52.509	3 02.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	34 .093
34	2 42.843	2 52.673	3 02.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	35 .096
35	2 43.007	2 52.836	3 02.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	36 .098
36	2 43.171	2 53.000	3 02.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	37 .101
37	2 43.334	2 53.164	3 02.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	38 .104
38	2 43.498	2 53.328	3 03.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	39 .106
39	2 43.662	2 53.492	3 03.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	40 .109
40	2 43.826	2 53.656	3 03.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	41 .112
41	2 43.990	2 53.819	3 03.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	42 .115
42	2 44.154	2 53.983	3 03.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	43 .117
43	2 44.317	2 54.147	3 03.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	44 .120
44	2 44.481	2 54.311	3 04.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	45 .123
45	2 44.645	2 54.475	3 04.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	46 .126
46	2 44.809	2 54.638	3 04.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	47 .128
47	2 44.973	2 54.802	3 04.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	48 .131
48	2 45.137	2 54.966	3 04.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	49 .134
49	2 45.300	2 55.130	3 04.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	50 .137
50	2 45.464	2 55.294	3 05.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	51 .139
51	2 45.628	2 55.458	3 05.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	52 .142
52	2 45.792	2 55.621	3 05.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	53 .145
53	2 45.956	2 55.785	3 05.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	54 .147
54	2 46.120	2 55.949	3 05.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	55 .150
55	2 46.283	2 56.113	3 05.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	56 .153
56	2 46.447	2 56.277	3 06.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	57 .156
57	2 46.611	2 56.441	3 06.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	58 .158
58	2 46.775	2 56.604	3 06.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	59 .161
59	2 46.939	2 56.768	3 06.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	



# TABLE III. MEAN SOLAR INTO SIDEREAL TIME.

Mean Solar.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.
m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s. s.
0	0 00.000	0 09.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 08.995	1 0.003
1	0 00.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 09.160	2 .005
2	0 00.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 09.324	3 .008
3	0 00.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 09.488	4 .011
4	0 00.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 09.652	5 .014
5	0 00.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 09.817	6 .016
6	0 00.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 00.124	1 09.981	7 .019
7	0 01.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 00.289	1 10.145	8 .022
8	0 01.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 00.453	1 10.310	9 .025
9	0 01.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 00.617	1 10.474	10 .027
10	0 01.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 00.782	1 10.638	11 .030
11	0 01.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 00.946	1 10.802	12 .033
12	0 01.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 01.110	1 10.967	13 .036
13	0 02.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 01.274	1 11.131	14 .038
14	0 02.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 01.439	1 11.295	15 .041
15	0 02.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 01.603	1 11.459	16 .044
16	0 02.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 01.767	1 11.624	17 .047
17	0 02.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 01.932	1 11.788	18 .049
18	0 02.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 02.096	1 11.952	19 .052
19	0 03.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 02.260	1 12.117	20 .055
20	0 03.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 02.424	1 12.281	21 .057
21	0 03.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 02.589	1 12.445	22 .060
22	0 03.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 02.753	1 12.609	23 .063
23	0 03.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 02.917	1 12.774	24 .066
24	0 03.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 03.081	1 12.938	25 .068
25	0 04.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 03.246	1 13.102	26 .071
26	0 04.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 03.410	1 13.266	27 .074
27	0 04.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 03.574	1 13.431	28 .077
28	0 04.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 03.739	1 13.595	29 .079
29	0 04.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 03.903	1 13.759	30 .082
30	0 04.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 04.067	1 13.924	31 .085
31	0 05.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 04.231	1 14.088	32 .088
32	0 05.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 04.396	1 14.252	33 .090
33	0 05.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 04.560	1 14.416	34 .093
34	0 05.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 04.724	1 14.581	35 .096
35	0 05.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 04.888	1 14.745	36 .099
36	0 05.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 05.053	1 14.909	37 .101
37	0 06.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 05.217	1 15.073	38 .104
38	0 06.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 05.381	1 15.238	39 .107
39	0 06.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 05.546	1 15.402	40 .110
40	0 06.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 05.710	1 15.566	41 .112
41	0 06.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 05.874	1 15.731	42 .115
42	0 06.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 06.038	1 15.895	43 .118
43	0 07.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 06.203	1 16.059	44 .120
44	0 07.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 06.367	1 16.223	45 .123
45	0 07.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 06.531	1 16.388	46 .126
46	0 07.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 06.695	1 16.552	47 .129
47	0 07.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 06.860	1 16.716	48 .131
48	0 07.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 07.024	1 16.881	49 .134
49	0 08.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 07.188	1 17.045	50 .137
50	0 08.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 07.353	1 17.209	51 .140
51	0 08.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 07.517	1 17.373	52 .142
52	0 08.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 07.681	1 17.538	53 .145
53	0 08.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 07.845	1 17.702	54 .148
54	0 08.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 08.010	1 17.866	55 .151
55	0 09.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 08.174	1 18.030	56 .153
56	0 09.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 08.338	1 18.195	57 .156
57	0 09.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 08.502	1 18.359	58 .159
58	0 09.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 08.667	1 18.523	59 .162
59	0 09.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 08.831	1 18.688	



# TABLE III. MEAN SOLAR INTO SIDEREAL TIME.

Mean Solar.	8 h.	9 h.	10 h.	11 h.	12 h.	13 h.	14 h.	15 h.	For Seconds.
m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s. s.
0	1 18.852	1 28.708	1 38.568	1 48.421	1 58.278	2 08.134	2 17.991	2 27.847	1 0.003
1	1 19.016	1 28.873	1 38.729	1 48.585	1 58.442	2 08.298	2 18.155	2 28.011	2 .005
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 08.463	2 18.319	2 28.176	3 .008
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 08.627	2 18.483	2 28.340	4 .011
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 08.791	2 18.648	2 28.504	5 .014
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 08.956	2 18.812	2 28.668	6 .016
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 09.120	2 18.976	2 28.833	7 .019
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 09.284	2 19.141	2 28.997	8 .022
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 09.448	2 19.305	2 29.161	9 .025
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 09.613	2 19.469	2 29.326	10 .027
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 09.777	2 19.633	2 29.490	11 .030
11	1 20.659	1 30.515	1 40.372	1 50.228	2 00.085	2 09.941	2 19.798	2 29.654	12 .033
12	1 20.823	1 30.680	1 40.536	1 50.393	2 00.249	2 10.105	2 19.962	2 29.818	13 .036
13	1 20.987	1 30.844	1 40.700	1 50.557	2 00.413	2 10.270	2 20.126	2 29.983	14 .038
14	1 21.152	1 31.008	1 40.865	1 50.721	2 00.578	2 10.434	2 20.290	2 30.147	15 .041
15	1 21.316	1 31.172	1 41.029	1 50.885	2 00.742	2 10.598	2 20.455	2 30.311	16 .044
16	1 21.480	1 31.337	1 41.193	1 51.050	2 00.906	2 10.763	2 20.619	2 30.476	17 .047
17	1 21.644	1 31.501	1 41.357	1 51.214	2 01.070	2 10.927	2 20.783	2 30.640	18 .049
18	1 21.809	1 31.665	1 41.522	1 51.378	2 01.235	2 11.091	2 20.948	2 30.804	19 .052
19	1 21.973	1 31.829	1 41.686	1 51.542	2 01.399	2 11.255	2 21.112	2 30.968	20 .055
20	1 22.137	1 31.994	1 41.850	1 51.707	2 01.563	2 11.420	2 21.276	2 31.133	21 .057
21	1 22.302	1 32.158	1 42.015	1 51.871	2 01.727	2 11.584	2 21.440	2 31.297	22 .060
22	1 22.466	1 32.323	1 42.179	1 52.035	2 01.892	2 11.748	2 21.605	2 31.461	23 .063
23	1 22.630	1 32.487	1 42.343	1 52.200	2 02.056	2 11.912	2 21.769	2 31.625	24 .066
24	1 22.794	1 32.651	1 42.507	1 52.364	2 02.220	2 12.077	2 21.933	2 31.790	25 .068
25	1 22.959	1 32.815	1 42.672	1 52.528	2 02.385	2 12.241	2 22.098	2 31.954	26 .071
26	1 23.123	1 32.979	1 42.836	1 52.692	2 02.549	2 12.405	2 22.262	2 32.118	27 .074
27	1 23.287	1 33.144	1 43.000	1 52.857	2 02.713	2 12.570	2 22.426	2 32.283	28 .077
28	1 23.451	1 33.308	1 43.164	1 53.021	2 02.877	2 12.734	2 22.590	2 32.447	29 .079
29	1 23.616	1 33.472	1 43.329	1 53.185	2 03.042	2 12.898	2 22.755	2 32.611	30 .082
30	1 23.780	1 33.637	1 43.493	1 53.349	2 03.206	2 13.062	2 22.919	2 32.775	31 .085
31	1 23.944	1 33.801	1 43.657	1 53.514	2 03.370	2 13.227	2 23.083	2 32.940	32 .088
32	1 24.109	1 33.965	1 43.822	1 53.678	2 03.534	2 13.391	2 23.247	2 33.104	33 .090
33	1 24.273	1 34.129	1 43.986	1 53.842	2 03.699	2 13.555	2 23.412	2 33.268	34 .093
34	1 24.437	1 34.294	1 44.150	1 54.007	2 03.863	2 13.720	2 23.576	2 33.432	35 .096
35	1 24.601	1 34.458	1 44.314	1 54.171	2 04.027	2 13.884	2 23.740	2 33.597	36 .099
36	1 24.766	1 34.622	1 44.479	1 54.335	2 04.192	2 14.048	2 23.905	2 33.761	37 .101
37	1 24.930	1 34.786	1 44.643	1 54.499	2 04.356	2 14.212	2 24.069	2 33.925	38 .104
38	1 25.094	1 34.951	1 44.807	1 54.664	2 04.520	2 14.377	2 24.233	2 34.090	39 .107
39	1 25.259	1 35.115	1 44.971	1 54.828	2 04.684	2 14.541	2 24.397	2 34.254	40 .110
40	1 25.423	1 35.279	1 45.136	1 54.992	2 04.849	2 14.705	2 24.562	2 34.418	41 .112
41	1 25.587	1 35.444	1 45.300	1 55.156	2 05.013	2 14.869	2 24.726	2 34.582	42 .115
42	1 25.751	1 35.608	1 45.464	1 55.321	2 05.177	2 15.034	2 24.890	2 34.747	43 .118
43	1 25.916	1 35.772	1 45.629	1 55.485	2 05.342	2 15.198	2 25.054	2 34.911	44 .120
44	1 26.080	1 35.936	1 45.793	1 55.649	2 05.506	2 15.362	2 25.219	2 35.075	45 .123
45	1 26.244	1 36.101	1 45.957	1 55.814	2 05.670	2 15.527	2 25.383	2 35.239	46 .126
46	1 26.408	1 36.265	1 46.121	1 55.978	2 05.834	2 15.691	2 25.547	2 35.404	47 .129
47	1 26.573	1 36.429	1 46.286	1 56.142	2 05.999	2 15.855	2 25.712	2 35.568	48 .131
48	1 26.737	1 36.593	1 46.450	1 56.306	2 06.163	2 16.019	2 25.876	2 35.732	49 .134
49	1 26.901	1 36.758	1 46.614	1 56.471	2 06.327	2 16.184	2 26.040	2 35.897	50 .137
50	1 27.066	1 36.922	1 46.778	1 56.635	2 06.491	2 16.348	2 26.204	2 36.061	51 .140
51	1 27.230	1 37.086	1 46.943	1 56.799	2 06.656	2 16.512	2 26.369	2 36.225	52 .142
52	1 27.394	1 37.251	1 47.107	1 56.964	2 06.820	2 16.676	2 26.533	2 36.389	53 .145
53	1 27.558	1 37.415	1 47.271	1 57.128	2 06.984	2 16.841	2 26.697	2 36.554	54 .148
54	1 27.723	1 37.579	1 47.436	1 57.292	2 07.149	2 17.005	2 26.861	2 36.718	55 .151
55	1 27.887	1 37.743	1 47.600	1 57.456	2 07.313	2 17.169	2 27.026	2 36.882	56 .153
56	1 28.051	1 37.908	1 47.764	1 57.621	2 07.477	2 17.334	2 27.190	2 37.047	57 .156
57	1 28.215	1 38.072	1 47.928	1 57.785	2 07.641	2 17.498	2 27.354	2 37.211	58 .159
58	1 28.380	1 38.236	1 48.093	1 57.949	2 07.806	2 17.662	2 27.519	2 37.375	59 .162
59	1 28.544	1 38.400	1 48.257	1 58.113	2 07.970	2 17.826	2 27.683	2 37.539	



# TABLE III. MEAN SOLAR INTO SIDEREAL TIME.

Mean Solar.	16 h.	17 h.	18 h.	19 h.	20 h.	21 h.	22 h.	23 h.	For Seconds.
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.
0	2 37.704	2 47.560	2 57.417	3 07.273	3 17.129	3 26.986	3 36.842	3 46.699	1 0.003
1	2 37.868	2 47.724	2 57.581	3 07.437	3 17.294	3 27.150	3 37.007	3 46.863	2 .006
2	2 38.032	2 47.889	2 57.745	3 07.602	3 17.458	3 27.315	3 37.171	3 47.027	3 .008
3	2 38.196	2 48.053	2 57.909	3 07.766	3 17.622	3 27.479	3 37.335	3 47.192	4 .011
4	2 38.361	2 48.217	2 58.074	3 07.930	3 17.787	3 27.643	3 37.500	3 47.356	5 .014
5	2 38.525	2 48.381	2 58.238	3 08.094	3 17.951	3 27.807	3 37.664	3 47.520	6 .016
6	2 38.689	2 48.546	2 58.402	3 08.259	3 18.115	3 27.972	3 37.828	3 47.685	7 .019
7	2 38.854	2 48.710	2 58.566	3 08.423	3 18.279	3 28.136	3 37.992	3 47.849	8 .022
8	2 39.018	2 48.874	2 58.731	3 08.587	3 18.444	3 28.300	3 38.157	3 48.013	9 .025
9	2 39.182	2 49.039	2 58.895	3 08.751	3 18.608	3 28.464	3 38.321	3 48.177	10 .027
10	2 39.346	2 49.203	2 59.059	3 08.916	3 18.772	3 28.629	3 38.485	3 48.342	11 .030
11	2 39.511	2 49.367	2 59.224	3 09.080	3 18.937	3 28.793	3 38.649	3 48.506	12 .033
12	2 39.675	2 49.531	2 59.388	3 09.244	3 19.101	3 28.957	3 38.814	3 48.670	13 .036
13	2 39.839	2 49.696	2 59.552	3 09.409	3 19.265	3 29.122	3 38.978	3 48.834	14 .038
14	2 40.003	2 49.860	2 59.716	3 09.573	3 19.429	3 29.286	3 39.142	3 48.999	15 .041
15	2 40.168	2 50.024	2 59.881	3 09.737	3 19.594	3 29.450	3 39.307	3 49.163	16 .044
16	2 40.332	2 50.188	3 00.045	3 09.901	3 19.758	3 29.614	3 39.471	3 49.327	17 .047
17	2 40.496	2 50.353	3 00.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	18 .049
18	2 40.661	2 50.517	3 00.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	19 .052
19	2 40.825	2 50.681	3 00.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	20 .055
20	2 40.989	2 50.846	3 00.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	21 .057
21	2 41.153	2 51.010	3 00.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	22 .060
22	2 41.318	2 51.174	3 01.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	23 .063
23	2 41.482	2 51.338	3 01.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	24 .066
24	2 41.646	2 51.503	3 01.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	25 .068
25	2 41.810	2 51.667	3 01.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	26 .071
26	2 41.975	2 51.831	3 01.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	27 .074
27	2 42.139	2 51.995	3 01.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	28 .077
28	2 42.303	2 52.160	3 02.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	29 .079
29	2 42.468	2 52.324	3 02.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	30 .082
30	2 42.632	2 52.488	3 02.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	31 .085
31	2 42.796	2 52.653	3 02.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	32 .088
32	2 42.960	2 52.817	3 02.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	33 .090
33	2 43.125	2 52.981	3 02.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	34 .093
34	2 43.289	2 53.145	3 03.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	35 .096
35	2 43.453	2 53.310	3 03.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	36 .099
36	2 43.617	2 53.474	3 03.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	37 .101
37	2 43.782	2 53.638	3 03.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	38 .104
38	2 43.946	2 53.803	3 03.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	39 .107
39	2 44.110	2 53.967	3 03.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	40 .110
40	2 44.275	2 54.131	3 03.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	41 .112
41	2 44.439	2 54.295	3 04.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	42 .115
42	2 44.603	2 54.460	3 04.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	43 .118
43	2 44.767	2 54.624	3 04.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	44 .120
44	2 44.932	2 54.788	3 04.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	45 .123
45	2 45.096	2 54.952	3 04.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	46 .126
46	2 45.260	2 55.117	3 04.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	47 .129
47	2 45.425	2 55.281	3 05.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	48 .131
48	2 45.589	2 55.445	3 05.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	49 .134
49	2 45.753	2 55.610	3 05.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	50 .137
50	2 45.917	2 55.774	3 05.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	51 .140
51	2 46.082	2 55.938	3 05.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	52 .142
52	2 46.246	2 56.102	3 05.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	53 .145
53	2 46.410	2 56.267	3 06.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	54 .148
54	2 46.574	2 56.431	3 06.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	55 .151
55	2 46.739	2 56.595	3 06.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	56 .153
56	2 46.903	2 56.759	3 06.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	57 .156
57	2 47.067	2 56.924	3 06.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	58 .159
58	2 47.232	2 57.088	3 06.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	59 .162
59	2 47.396	2 57.252	3 07.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	



# TABLE. IV.

TABLE GIVING THE CORRECTION OF  $\alpha$  URSÆ MINORIS AND  $\delta$  URSÆ MINORIS  
FOR TERMS OF NUTATION INVOLVING  $2\zeta$ .

$\Delta$ or $\Delta - 180^\circ$	$\alpha$ Ursæ Minoris.		$\delta$ Ursæ Minoris.		$\Delta$ or $\Delta - 180^\circ$	$\Delta$ or $\Delta - 180^\circ$	$\alpha$ Ursæ Minoris.		$\delta$ Ursæ Minoris.		$\Delta$ or $\Delta - 180^\circ$
	R.A.	Dec.	R.A.	Dec.			R.A.	Dec.	R.A.	Dec.	
0	—229	+03	—008	—09	90	45	—075	—08	+078	—01	135
1	231	.02	.005	.09	91	46	.067	.08	.078	—01	136
2	233	.02	—003	.09	92	47	.058	.08	.079	.00	137
3	235	.02	.000	.09	93	48	.050	.08	.079	.00	138
4	236	.01	+003	.09	94	49	.042	.08	.078	.00	139
5	—238	+01	+006	—09	95	50	—034	—08	+078	+01	140
6	239	+01	.008	.09	96	51	.026	.08	.078	.01	141
7	240	.00	.011	.09	97	52	.017	.08	.077	.01	142
8	240	.00	.013	.09	98	53	—008	.08	.077	.02	143
9	240	.00	.016	.09	99	54	.000	.08	.077	.02	144
10	—240	.00	+019	—09	100	55	+008	—08	+076	+02	145
11	240	—01	.021	.09	101	56	.016	.08	.075	.03	146
12	239	.01	.024	.08	102	57	.025	.08	.074	.03	147
13	238	.01	.026	.08	103	58	.033	.08	.073	.03	148
14	236	.02	.029	.08	104	59	.042	.08	.072	.04	149
15	—235	—02	+032	—08	105	60	+050	—08	+071	+04	150
16	233	.02	.034	.08	106	61	.058	.08	.070	.04	151
17	231	.03	.037	.08	107	62	.066	.08	.069	.04	152
18	229	.03	.039	.08	108	63	.074	.08	.067	.05	153
19	226	.03	.042	.08	109	64	.082	.08	.066	.05	154
20	—223	—03	+044	—07	110	65	+090	—07	+064	+05	155
21	220	.03	.046	.07	111	66	.097	.07	.063	.05	156
22	216	.04	.048	.07	112	67	.105	.07	.061	.06	157
23	212	.04	.050	.07	113	68	.112	.07	.060	.06	158
24	208	.04	.052	.07	114	69	.120	.07	.058	.06	159
25	—204	—04	+054	—06	115	70	+127	—07	+056	+06	160
26	200	.05	.055	.06	116	71	.134	.07	.054	.06	161
27	196	.05	.057	.06	117	72	.141	.07	.052	.07	162
28	190	.05	.059	.06	118	73	.148	.07	.050	.07	163
29	185	.05	.061	.06	119	74	.154	.06	.048	.07	164
30	—179	—05	+063	—05	120	75	+161	—06	+046	+07	165
31	173	.06	.064	.05	121	76	.167	.06	.045	.07	166
32	168	.06	.065	.05	122	77	.173	.06	.043	.08	167
33	162	.06	.067	.05	123	78	.178	.05	.040	.08	168
34	155	.06	.068	.04	124	79	.184	.05	.037	.08	169
35	—148	—06	+070	—04	125	80	+189	—05	+034	+08	170
36	141	.07	.071	.04	126	81	.194	.05	.031	.08	171
37	133	.07	.072	.03	127	82	.199	.04	.029	.08	172
38	126	.07	.073	.03	128	83	.204	.04	.026	.08	173
39	119	.07	.074	.03	129	84	.207	.04	.024	.09	174
40	—113	—07	+075	—02	130	85	+212	—04	+022	+09	175
41	106	.07	.076	.02	131	86	.216	.03	.020	.09	176
42	.099	.07	.077	.02	132	87	.220	.03	.017	.09	177
43	.092	.08	.077	.02	133	88	.223	.03	.013	.09	178
44	.084	.08	.078	.01	134	89	.226	.03	.011	.09	179
45	—075	—08	+078	—01	135	90	+229	—03	+008	+09	180

NOTE. — These corrections were omitted in the places of these Stars in the volumes of this Ephemeris for 1857, 1858, and 1859. They have been applied in this volume.











